The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Vol. XXIV, No. 17 CHICAGO August 13, 1921

EDITORIAL DEPARTMENT—

Nathan C. Rockwood, Editor
Chas. A. Breskin, Assistant Editor

ADVERTISING STAFF—

Charles H. Fuller, Eastern Manager,
101 West 41st Street, New York City

A. S. Barnett
Western Representative

SUBSCRIPTION—Two dollars a year to U. S. and Possessions. Three dollars a year to Canada and foreign countries. Twenty-five cents for single copies.

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ROCK PRODUCTS—

Geo. P. Miller, Manager
E. M. Gibson, Assistant Manager

Published every other Saturday by

TRADEPRESS PUBLISHING CORP.
542 South Dearborn Street, Chicago, Ill.

W. D. Callender, President.
N. C. Rockwood, Vice-President.
Geo. P. Miller, Treasurer.
C. O. Nelson, Secretary.

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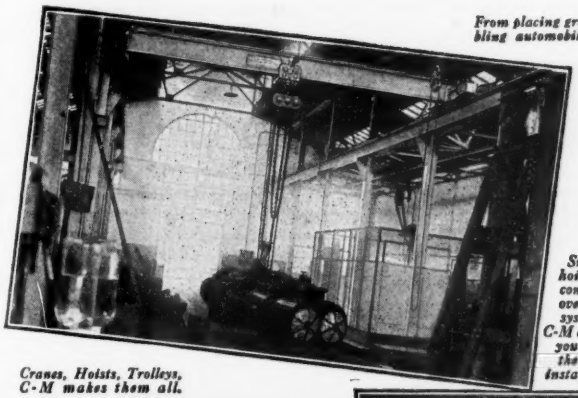

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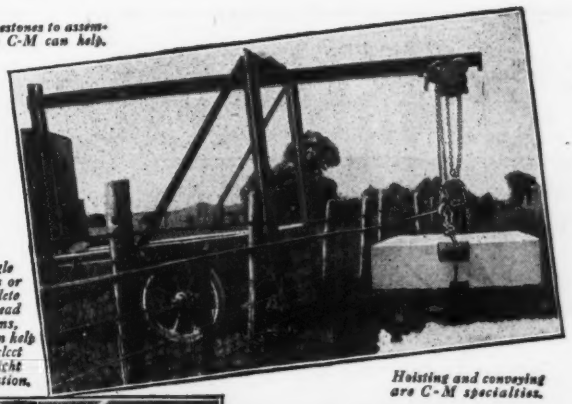

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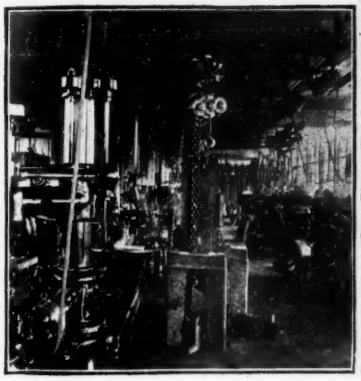

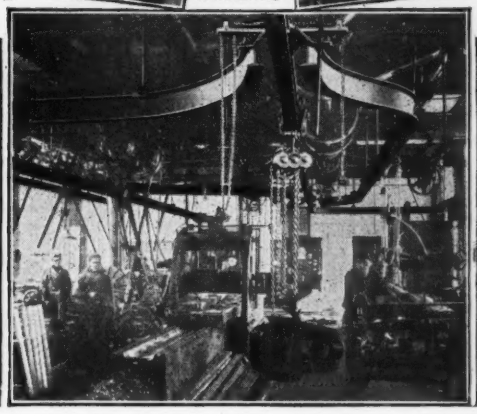

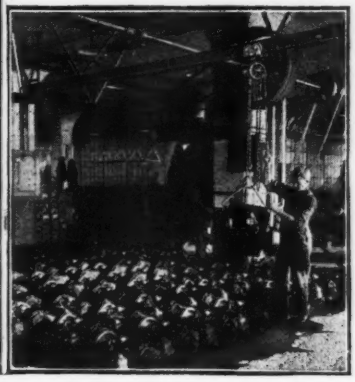

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The photographs on this page are selected to illustrate seven out of scores of different C-M methods in successful use today. Note that they range from single-unit, 40-ton chain hoists to hoists and trolleys combined into a single unit.

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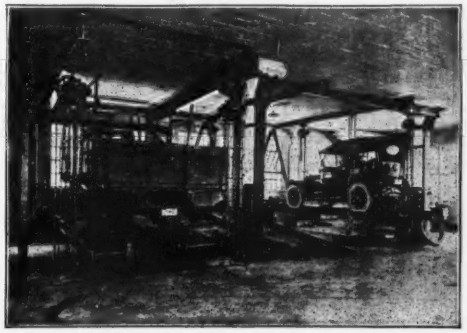
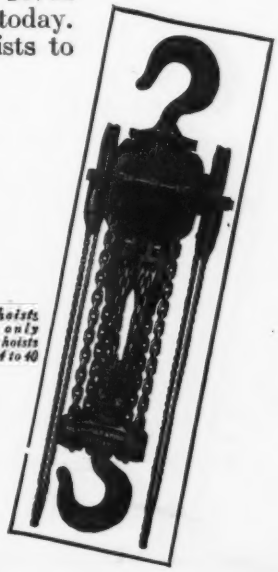
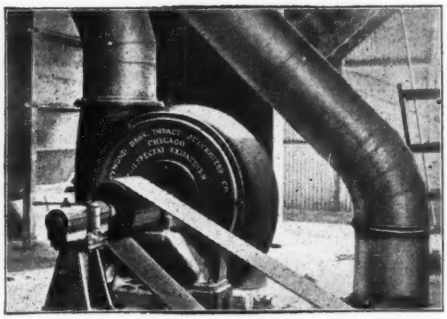
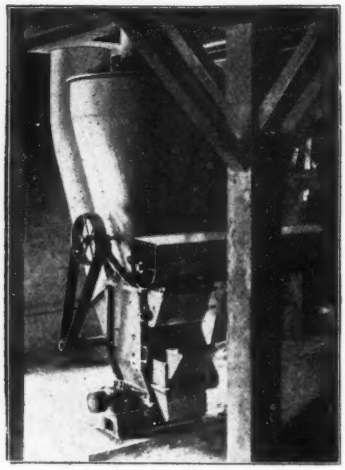
Shock absorber hoists are just one of a dozen C-M hoisting specialties.

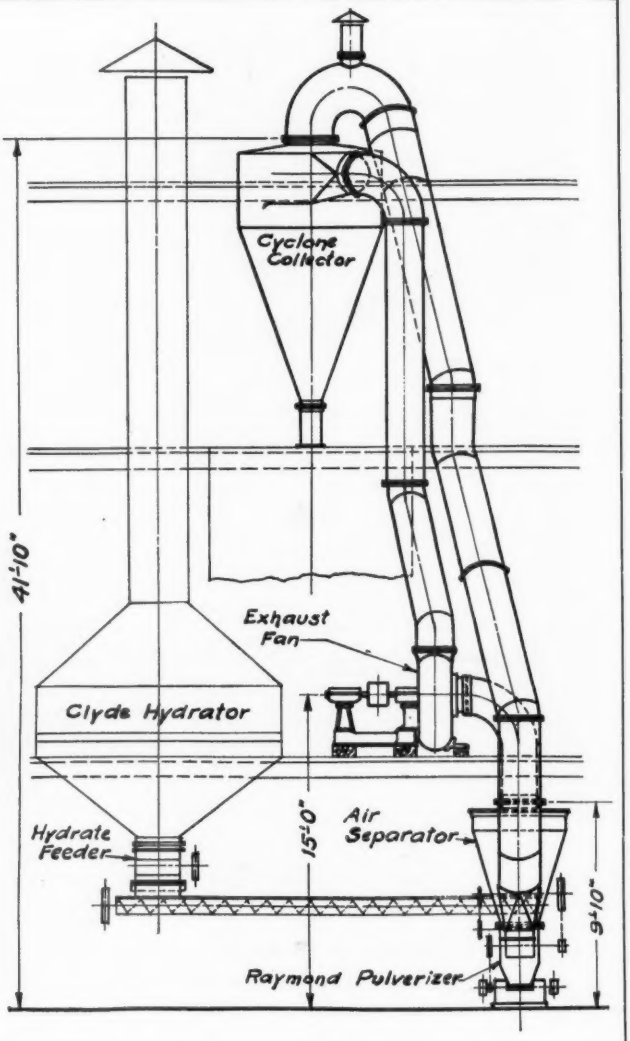


Cyclone hoists are the only single-unit hoists built from 4 to 40 ton









A Raymond Air Separation System Replaced Screens in this Hydrate Plant

improving the product and saving 10% of good hydrate which was being lost in the tailings.

For making either Mason's, Finishing or Chemical Lime the Raymond System has established itself permanently in the Hydrated Lime Industry.

It not only saves good hydrate, which is lost by the use of other systems, but it improves the lime you are making and takes the place of all the machinery and hand labor now required between the Hydrator and finished product bin.

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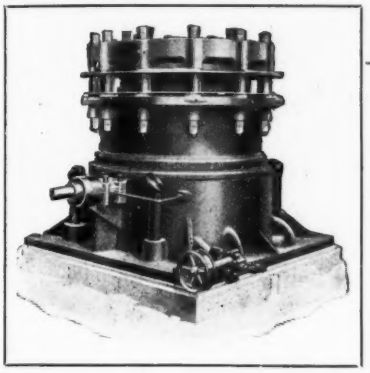
New York City

Raymond Bros. Impact Pulverizer Co.

1301 North Branch Street Chicago, Ill.

Western Office
201 Boston Building
Denver, Colo.

ROCK CRUSHERS

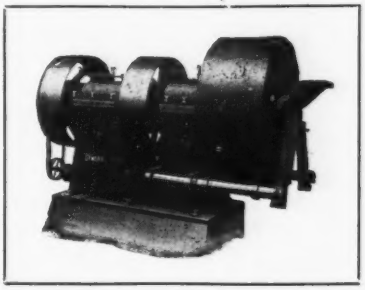


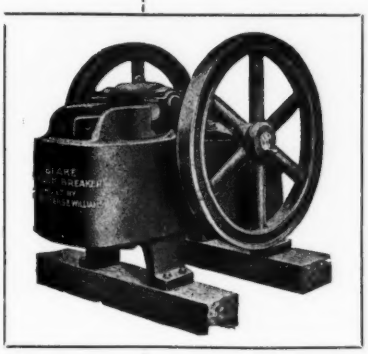
Symons Vertical Disc Crusher

A large capacity crusher requiring low horse power. It gives a uniform product and has a wide range of reduction.

The Symons Disc Crusher

An improved type with revolving manganese discs which combine a rocking movement to prevent "packing" trouble when small sizes are crushed.



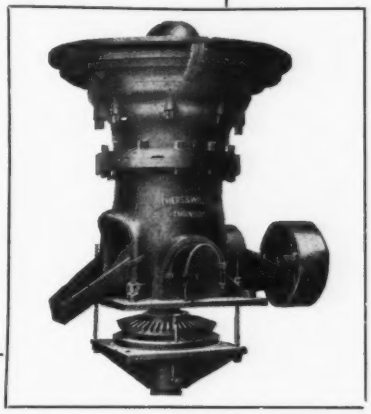


The Blake Rock Breaker

A sturdy design with minimum number of wearing parts. The crushing plates can be reversed and reused.

Bronze Ball Gyratory Crusher

A machine having a ball and socket seat for the main shaft to give a large bearing surface and to reduce re-babbitting to a minimum.



See Our Exhibit at Space No. 93, American Mining Congress Exposition, Coliseum, Chicago, October 17-22

Manufactured and Sold by

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Look Ahead!

Now is the logical time to prepare for increased activity in your business—increased activity that is bound to come.

In every industry—in *your* industry—forward looking companies are going over their plant equipment now. They are making repairs and improvements; discarding antiquated machinery; installing modern, more efficient and economical devices.

Will you be prepared as the pendulum swings back?

If you crush or screen any material, the HUM-MER Electric Screen will help you keep in the front rank of your industry. You will have an advantage over your competitors who are hanging on to old and obsolete equipment, and you will prevent the progressive from getting an advantage over you.

Many users of HUM-MER Electric Screens report doubled, trebled and even greater increased tonnages due to the HUM-MER.

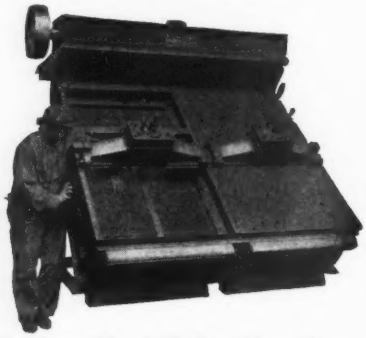
ACT NOW!

Tell us your requirements and we will submit a proposition

THE W. S. TYLER COMPANY

CLEVELAND, OHIO

Manufacturers of Woven Wire Screens and Screening Equipment



Catalogue No. 42-R Sent Upon Request

HUM-MER *Electric* SCREEN

"Makes Wire Cloth Screen Faster and Wear Longer"

Telsmith Makes a Hit with the Super—

The No. 2 Telsmith Reduction Crusher shown in the picture, is operated by the Olivine Co. of Marquette, Mich., crushing a very hard green trap rock to minus ¾" size. The picture was taken to show one thing—that the Telsmith Reduction Crusher can be choke fed. It is the only secondary crusher that does not require hand or mechanical feeding. In fact, this machine does its best work when covered up—buried deep—snowed under with a big accumulation of rock. It requires no supervision, except the usual hourly reading of the oil temperature and the weekly tightening of the bolts. Throw in the lever when the whistle blows; and it will run all day, crushing limestone or trap rock with equal facility, with the bolts tight and the oil only luke warm.

Capacity, at ½" bottom opening, 10-12 tons per hour. Power required, 20 H.P. Weight, 13,600 lbs.

If you want further particulars send for our bulletin No. 2F11 (Telsmith Reduction Crusher) and Catalog No. 166 (Telsmith Primary Breaker). No obligation.

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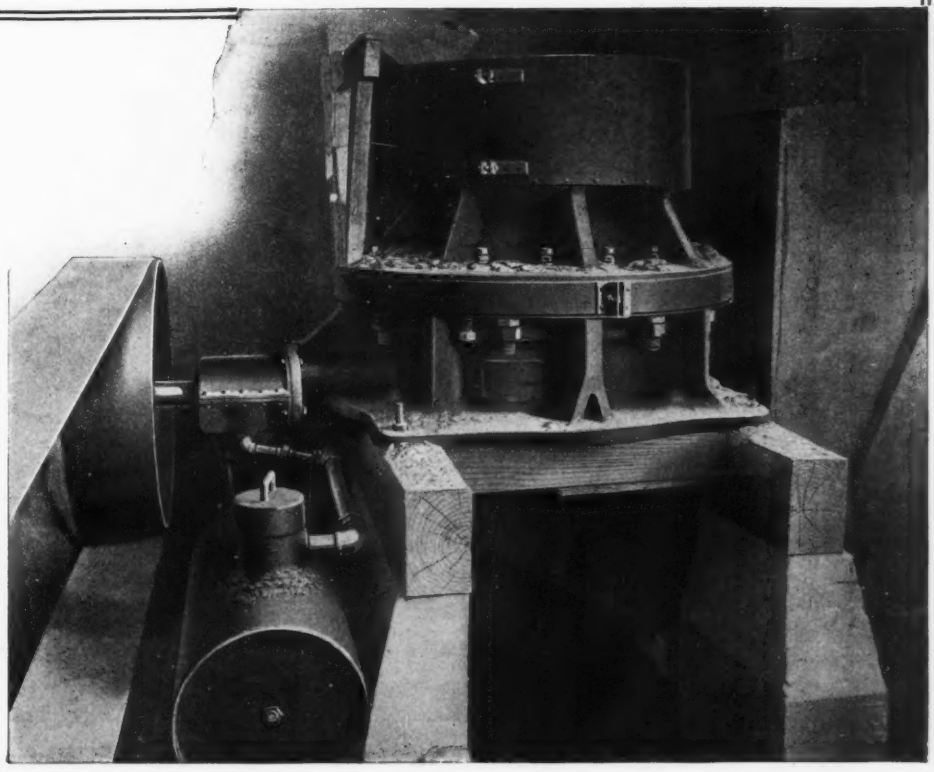
3188 Locust St., Milwaukee, Wis.

Canadian Representatives:
Canadian Ingersoll-Rand Co., Montreal, P. Q.



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50 Church St., New York City
806 Otis Bldg., Philadelphia, Pa.
261 Franklin St., Boston, Mass.
110 W. Park Way, N. S. Pittsburgh, Pa.
Brunson Bldg., Columbus, O.
2540 University Ave., St. Paul, Minn.
207 W. Third St. Des Moines, Ia.
Bowman Mchy. Co. Omaha, Nebr.
Bunting Hdwe. Co. Kansas City, Mo.
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Salt Lake Hardware Co., Salt Lake City, Utah
625 Market St., San Francisco, Calif.
Road Builders Equip. Co., Portland, Ore.

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Day-after-Day

Whether you are taking on a new workman or a new locomotive you look for dependability, You want steady results first, day in and day out, and then the ability to draw on a little reserve for emergencies.

Vulcan Locomotives, both large and small, are built to give steady, reliable service of the sort needed for economical hauling and they also have a good reserve capacity which is usually hard to find in small locomotives. Let us know what your requirements are and undoubtedly we can give you data concerning similar conditions.

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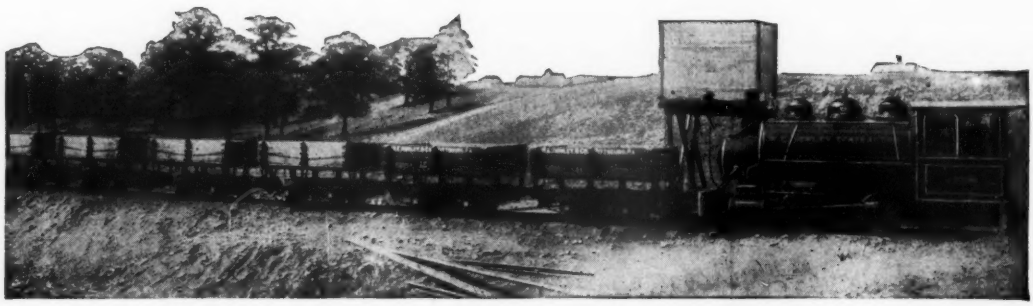
Established 1849

1753 Main Street **Wilkes-Barre, Pa.**



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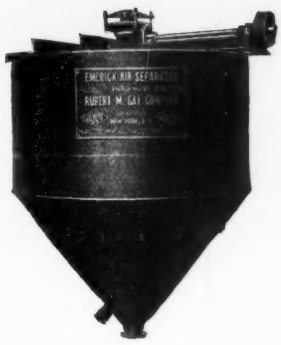
are equipped with Cement Type

EMERICK AIR SEPARATORS



They are installed in the

NEW OKLAHOMA PORTLAND CEMENT PLANT

The plants of the Southwestern P. C. Co. at Victorville and El Paso.

The Three Forks P. C. Co., the Riverside P. C. Co., and others in this country, India and Japan.

Increased Capacity — Uniform Fineness

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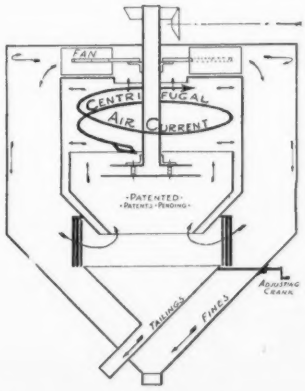
are being equipped with the

GAYCO-EMERICK AIR SEPARATORS

A NEW SEPARATOR OPERATING ON A NEW PRINCIPLE



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The only device that will separate soft, abrasive materials to a fineness of approximately 100 per cent 60 to 350 mesh.

For Limestone, Clay, Quartz, Coal, Bone Ash, Feldspar, Gypsum, Plaster, Phosphate Rock, Talc and other materials.

Can be used with any type of Grinding Mill, improving capacity and fineness and absolutely the only separator that will maintain a uniform fineness of product irrespective of variations in speed, feed or atmospheric conditions.

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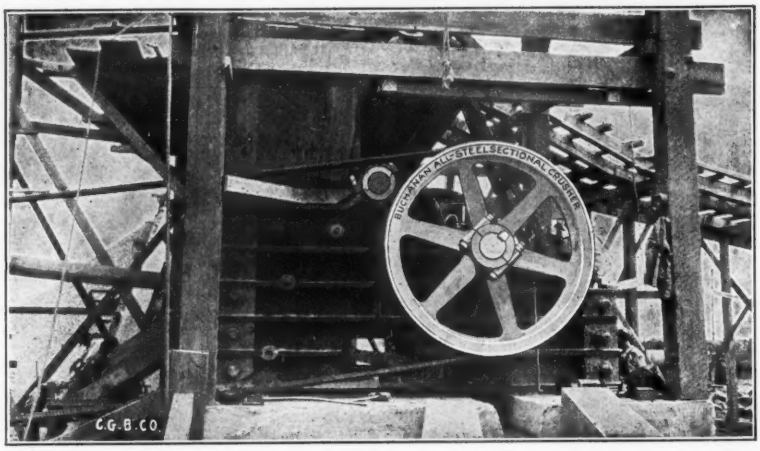


A Necessity *for* Crushing *the* Hard *and* Tough Texas Trap Rock

The Texas Trap Rock Co., at Knippa, Texas, has a deposit of trap rock that perhaps has no parallel in toughness and hardness; in fact, at the beginning of its operations, the replacements of broken parts, due to the unusual toughness of the rock, absorbed the profits, and the plant was even closed for a time.

We were then called upon to construct a 40x42″ special all steel jaw crusher and now the production goes steadily on.

This crusher has a capacity of 200 tons of rock per hour and reduces the rock to an 8″ size.

No matter how difficult your crushing problem is, there is a size and type of Buchanan Crusher for your work.

We will send a catalog on request

C. G. BUCHANAN CO., Inc.

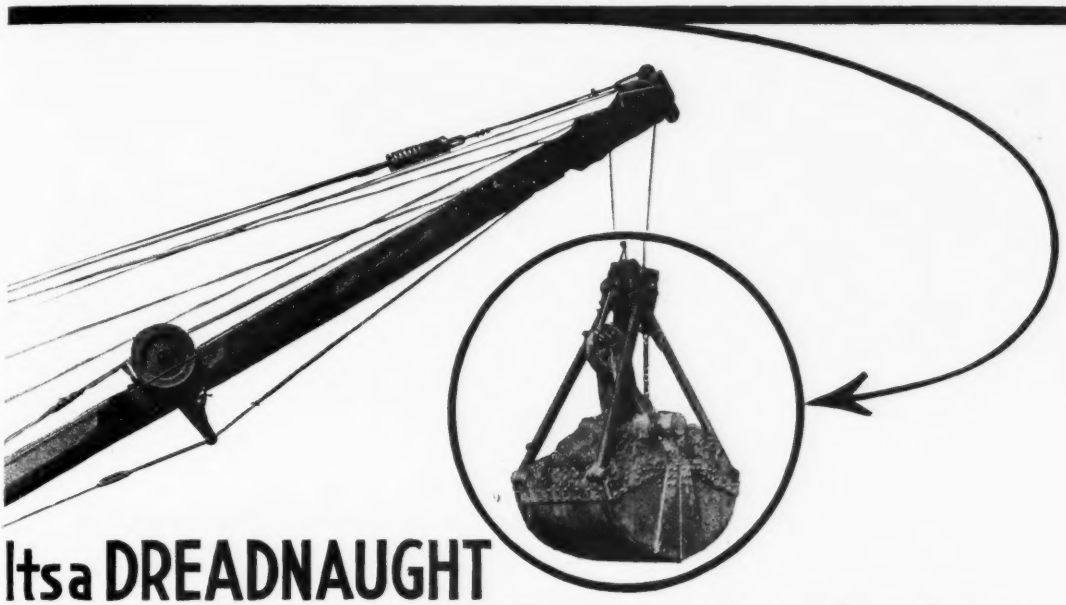
Cedar and West Streets **New York**

Crushing Machinery, Crushing Rolls and Magnetic Separators

BUCHANAN JAW CRUSHERS

ALL STEEL PATENTED

See that load!!



Its a DREADNAUGHT handling Rock Asphalt

Taking a capacity load when working in tough, sticky rock asphalt is typical of what can be accomplished by the Blaw-Knox Dreadnaught Bucket.

It is the hardest digging, fastest dumping bucket (for its weight) on the market and is recommended for all kinds of dredging and excavating; or the rehandling of obstinate materials.

The bucket illustrated is in the service of J. H. Cahill, Louisville, Ky. Mr. Cambell, his Superintendent, speaks highly of the bucket and recommends it to all who have rehandling or digging problems to solve. Mr. Cambell's good opinion will be sustained by every Dreadnaught buyer—we know it because we are acquainted with the possibilities and capabilities of the Dreadnaught.

ASK ABOUT IT

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BLAW-KNOX

PLYMOUTH

Showing 3-ton PLYMOUTH Gasoline Locomotive in Edward H. Everett Company's Plant at Toboso, Ohio.

The strong, serviceable PLYMOUTH Locomotive is always a source of profit and satisfaction to the owner. Here's what Superintendent O. A. Farmer writes:

> "We are mailing you photo of a 3-ton PLYMOUTH Gasoline Locomotive working at the Edward H. Everett Company's sand plant at Toboso, Ohio. Over eight hundred feet of track it hauls five tons of rock at a trip. I am highly elated over the service it gives. The up-keep is practically nothing. For the last year the only repair needed was a set of brake shoes."

The low up-keep comes out of the fact that the PLYMOUTH Gasoline Locomotive is made "a little better than necessary." Ask for literature and give us a hint of your haulage problem. It is our business to advise and help.

The Fate-Root-Heath Company :: Plymouth, Ohio

PLYMOUTH

Gasoline Locomotives

Rock Products

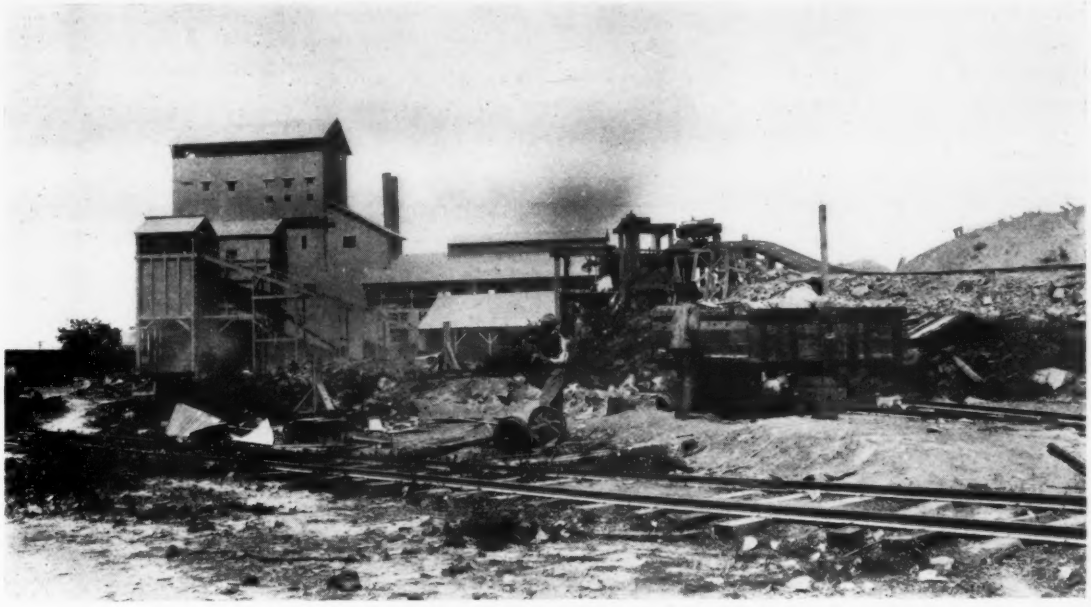
VOL. XXIV Chicago, August 13, 1921 No. 17

Texas Trap Rock Plant

Texas Trap Rock Company at Knippa Has Deposit Containing Materials of Unusual Hardness and Toughness—Details of Quarry and Crushing Operations

ONE ORDINARILY connects the word "trap rock" with Connecticut or New Jersey, where the trap rock industry is mainly centered. However, the face they are decidedly a disadvantage when it comes to quarrying and crushing the rock.

In chemical composition the Texas trap broken heads, bent shafts, etc., due to the unusual toughness of the rock. The replacement of these parts absorbed the profits of the company and it was even



Plant of Texas Trap Rock Co., Knippa, Texas

Texas Trap Rock Co., at Knippa, Tex., has a deposit of trap rock that perhaps has no parallel in the way of toughness and hardness with any rock in the East. Recent tests at the University of Texas showed the following physical determinations for the rock:

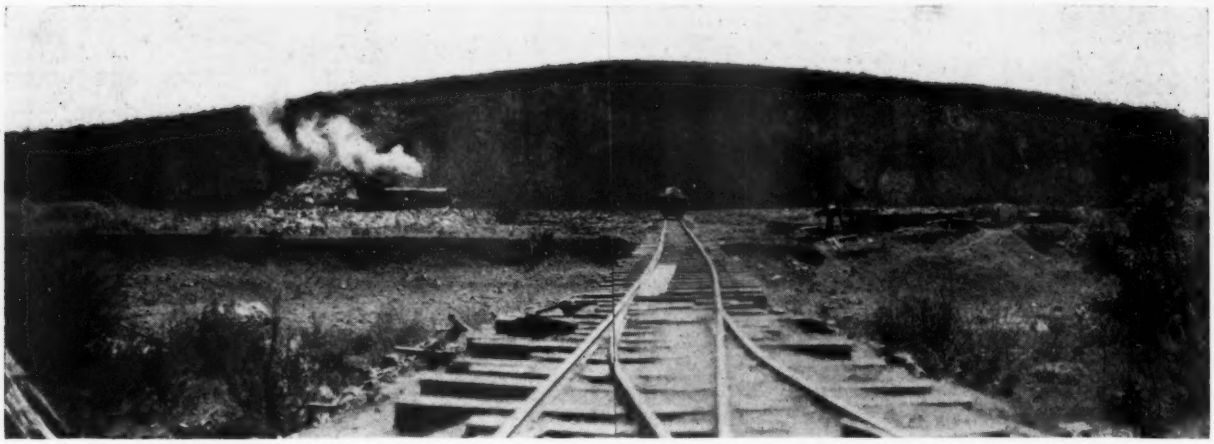
Specific gravity	3.13	
Weight per cu. ft.	195	lbs.
Per cent of wear	1%	
French coefficient of wear	40	
Hardness	18.24	
Toughness	32	
Cementing value	39	
Crushing strength (2 in. cube)	34,600	lbs. per sq. in.

It can be seen from the above analyses that the rock is unusually well fitted for road-building purposes. But, while the hardness and toughness of the rock may be a decided advantage in a highway surrock shows the following analysis:

	Per cent
Silica	35.76
Alumina	18.65
Oxide of iron	10.27
Lime	12.52
Magnesia	11.26
Carbonic acid	0.10
Sulphuric acid	1.85
Sodium oxide	5.42
Potassium oxide	1.13
Loss on ignition	2.65
	99.61

The company was first organized in 1914 and the plant was operated as a hand-loading proposition, the crushing plant consisting of a No. 8 gyratory crusher, two No. 5 gyratories, and a set of rolls. From the very beginning of its operation the company began to encounter trouble with the crushers, which had closed for a time. However, in January, 1920, the company rebuilt the plant, adding a specially built jaw crusher for initial crushing, and remodeling the rest of the plant so as to give it increased capacity.

This plant is the only trap rock plant in Texas and its trade is more of the specialized sort. The company concentrates on the manufacture of stone, 7/8-in. and smaller in size, which is used for asphalt streets, road construction and for concrete warehouse and factory floors. While the rock costs considerably more to produce than ordinary rock, due as explained previously to the wear and tear on machinery resulting from the extraordinary qualities of the rock, the mate-



Panoramic view of quarry

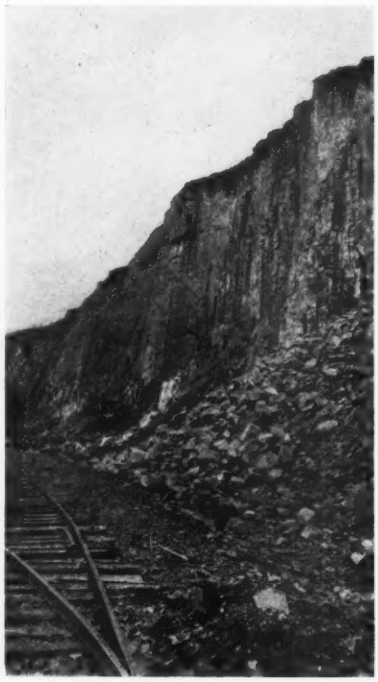
rial is in great demand where hardness, toughness and resistance to wear and fire resistance are wanted, and so commands a better price than ordinary crushed stone.

Quarry Operation

The quarry has an almost vertical face measuring 80 ft. in height and 1,000 ft. in length. As the face is pushed back it is constantly increasing in height.

The rock was first toe-holed for blasting when operations started. The company found, however, in the course of time that this method was impracticable, so tunnel shooting was resorted to. The tunnel is usually made 3 by 4 ft. in cross-section and then driven 40 ft. and a cross-cut made, according to the size of blast that is desired. The tunnel is filled in with 40 per cent special gelatine dynamite, the dynamite being proportioned in three places, one charge in the middle and one at each end of the cross-cut. The dynamite charges are usually spaced about 20 ft. apart and recent shots have given six tons of rock per pound of dynamite.

The rock being hard and tough, considerable secondary shooting is necessary. For this purpose a jackhammer and 60-per cent dynamite is used for breaking up extra large pieces and mud capping for the smaller pieces.



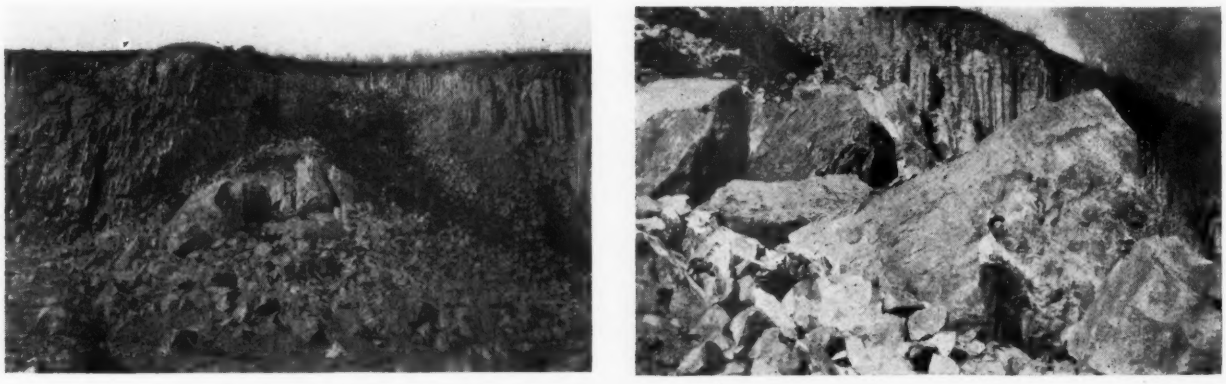
Character of deposit

The rock is loaded into 4-cu. yd. side-dump, 36-in. gauge cars by a 60-ton railroad type Marion steam shovel having a 1½-cu. yd. dipper. The haul to an incline leading to the initial crusher is made by a gasoline locomotive, the distance being approximately 1,000 ft. over a practically level grade. The gasoline locomotives are of the company's own design and manufacture and it is described in the "Hints for Superintendents" department of this issue of Rock Products.

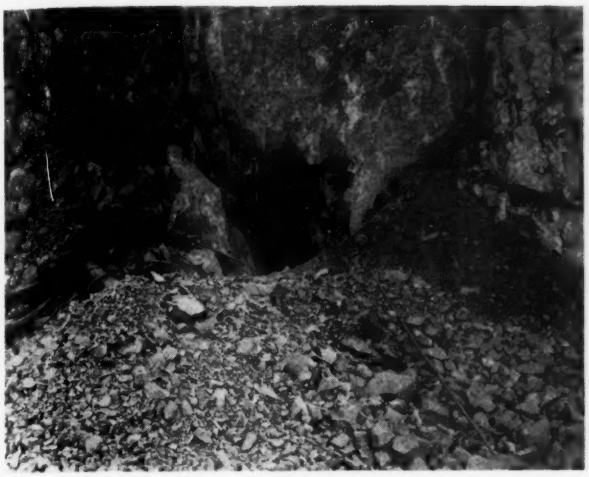
The gasoline locomotive hauls the cars to within 500 ft. of the crusher hopper, switches back and returns to the quarry with the empty cars. Two such locomotives are plying between the crusher and quarry at all times, thus keeping the shovel at work. The gasoline locomotives are capable of hauling 20 tons very effectively.

Crushing Plant

From the foot of the incline the cars are hauled up a trestle by a steam-driven hoist and side-dumped into a hopper feeding a 40x42-in. special all-steel Buchanan

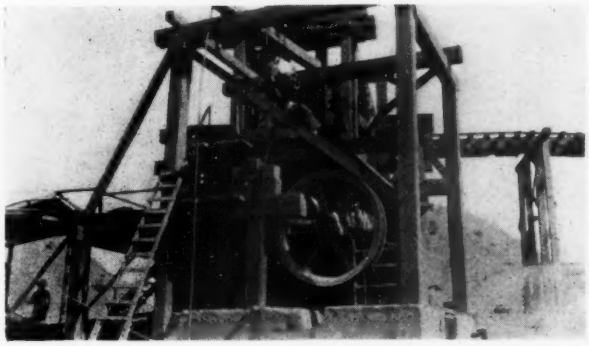


Results of a blast. Note the large pieces thrown out, in the illustration on the right



Tunneling into deposit

Gasoline locomotive and cars at steam shovel



Initial crushing plant

Dumping cars into jaw crusher

jaw crusher. The flow of the rock to the crusher is controlled by a gate which is also mechanically operated. The hoist used for hauling the cars also operates the gate, it being a double-drum type, 22x30 in. The hoist is in charge of one man.

The jaw crusher has a capacity of 200 tons of rock per hour and it reduces the rock to an 8-in. size, discharging on a 30-in. belt conveyor of 100-ft. centers, running on a 16-degree inclination and located directly underneath the jaw crusher. This conveyor discharges into a No. 8 gyratory crusher, which has a nickel steel shaft and a specially built manganese steel ventilated head. It has been found by sad experience that these are about the only materials that will withstand the wear and tear caused by this extremely tough rock. The gyratory crusher reduces the rock to 4-in. and from here it is reclaimed by a bucket elevator of 40-ft. centers and discharged into a storage bin of 20-ton capacity.

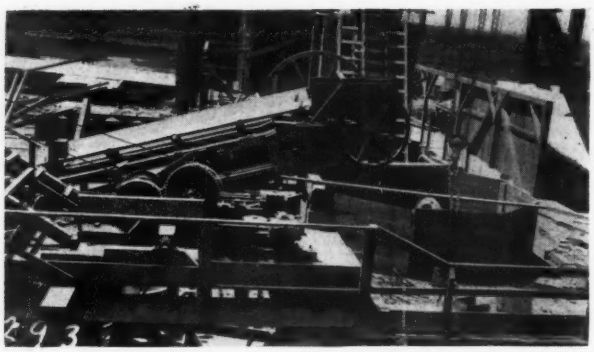
As the rock is needed it is discharged from the bin by gravity directly into a 48-in.x16-ft. scalping screen, which screens out all the material ½-in. and down, discharging it on a 14-in. belt conveyor of 30-ft. centers, which in turn discharges to another belt conveyor at right angles to it, also 14 in. wide and 100 ft. centers, traveling on a 20-degree inclination. The last belt conveyor discharges into a storage bin of 100 tons capacity.

Gyratory crusher head—manganese steel

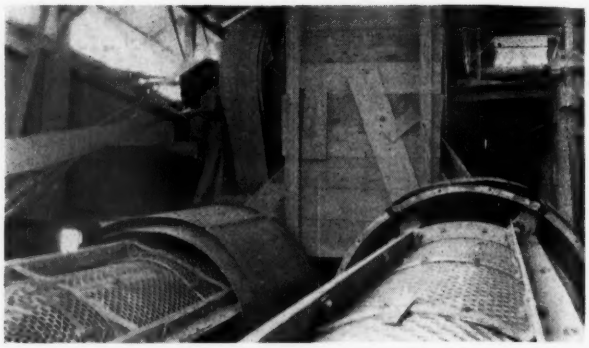
Sizing

The oversize from the scalping screen, 2-in. and over goes to two No. 5 gyratory crushers, which reduce the stone to 2-in. It is reclaimed from here by a bucket elevator of 90-ft. centers and discharged into two sizing screens, each 48-in.x20-ft. These screens size all the material 1¾-in. down, the oversize being returned to two other No. 5 gyratory crushers, which reduce the rock to 1¾-in., and it is then reclaimed and returned to the screens for sizing.

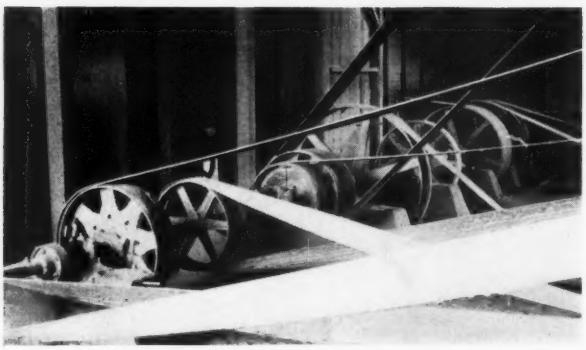
The materials marketed by this company come in the following sizes: ¼-in. to dust, ½-in. to dust, ⅞-in. to ¼-in., ½-in. to ¼-in., and 1¾-in. to 1-in. These different sizes are stored in six bins, each capable of holding 100 tons and are so located over the railroad tracks as to be discharged into the cars by gravity.



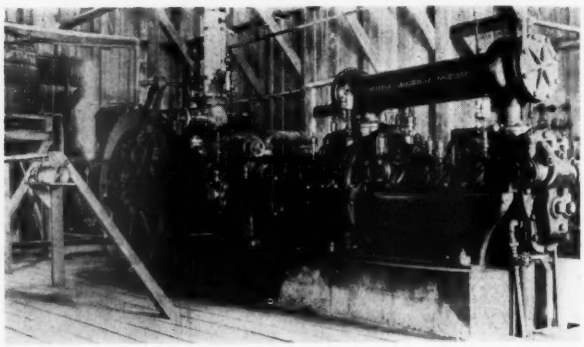
Belt conveyor depositing to gyratory crusher



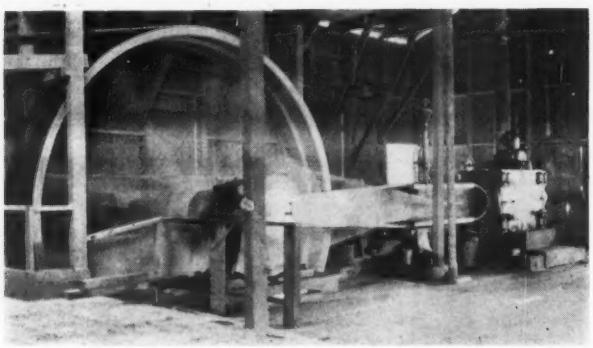
Sizing screens



Jackshaft in screening plant



Air compressor



One of the steam engines

General view of plant

A set of two 14x30-in. rolls is used for re-crushing 1¾-in., 1¼-in. and 1-in. material to smaller sizes. The material is chuted from the bins to the rolls and after crushing to the desired size the material is reclaimed by a bucket elevator distributing back to the bins. The bins have two loading tracks under them and one on the outside.

Power

The power is developed from steam generated by four water-tube boilers, each having 125 b. h. p. Oil is used for fuel and the steam generated is used to run the hoist mentioned previously and two Corliss engines of 250 and 275 h. p., respectively. These two engines drive the plant in two units, one driving the jaw crusher, the No. 8 gyratory, hoist and conveyor while the other drives the rest of the plant. Two air compressors are also driven by the 275 h. p. steam engine. The power is transmitted to the jaw crusher by a 4-sheave rope drive.

The plant has a capacity of 750 tons per 10-hour day and is situated on the Southern Pacific Ry. about 90 miles west of San Antonio where the company does considerable business and also where its offices are located.

Personnel

The president of the Texas Trap Rock Co. is P. W. Prosser; vice-president, Adolph Wagner; secretary, Albert Steves, Jr.; treasurer and general manager, A. H. Muir, and superintendent H. Graham.

Limestone and Phosphate on Pastures

LITTLE attention has been given in any constructive way to the pasture problem in Ohio, according to Prof. Firman E. Bear, of Ohio State University. He states: "Such evidence as we have, coupled with a study of similar investigations elsewhere, particularly in England, lead us to believe that basic slag, or limestone and acid phosphate, offer the greatest promise in pasture improvement. The expenditure on pasture land is limited by the small acre return. Furthermore, it has been shown that nitrogenous fertilizers tend to increase the quantity at the expense of the quality and to eliminate the desirable white clover. Potash in pasture fertilization merits consideration."

Future Prices of Construction Materials

Reason to Believe Prices Will Be Relatively High

AN INTERESTING AND AUTHORITATIVE analysis of the present market conditions in building materials is contained in an editorial in the August 10 issue of "Engineering and Contracting," whose editor, Halbert P. Gillette, is a well-known political economist. Mr. Gillette writes:

"The price level of building materials, other than steel, averaged in June about 100 per cent above the average in the year 1913. The general level of wholesale prices of all commodities was about 50 per cent above the pre-war level. In other articles (see April 7, 1920, and August 3, 1921) it has been shown that price and wage levels are proportional to the per capita money, and that per capita money is 60 per cent above the pre-war amount. Hence we may confidently look for a new wage and price level about 60 per cent above that of 1913. But in doing so it should be remembered that certain commodities will probably remain below the new level of 160, whereas others will remain above it. There is a tendency for the price of any commodity to seek the general price level, but each class of commodity is affected by economic forces that differ from the average. Thus, efficiency of production in the mining field has risen much more rapidly during the last 20 years than in the agricultural field. As efficiency rises prices tend to fall. Hence the rate of price decline in one field will differ from that in another field, according as the productive efficiencies in those fields differ.

"Labor, fuel and freight enter into the cost of building materials to a greater extent than is the case with most products. Fuel is high (87 per cent above the 1913 level), and will probably remain high for about a year, because of the long time agreement with the coal miners as to wages. Freight is high (about 80 per cent above the 1913 level) and will remain high for several years, not only because of the extraordinarily high wages paid to the railway employes, but because railway rates were much too low prior to the war.

"For these reasons it is evident that cement, brick, crushed stone, sand, etc., will remain relatively high.

"But other conditions are operating to hold building materials up. There is only a very small stock of building materials on hand, and there is a very great latent demand due to the subnormal construction of the past five years. These were the conditions existing at the close of our Civil War, and they resulted in maintaining a price level of building materials from 70 to 100 per cent above the level of 1860 for a period of eight years after the war ended in 1865, despite the decline of prices of other commodities. In fact, it was not till 1892, or 32 years after the Civil War ended, that the price level of building materials returned nearly to the level of 1860; even then it was 12 per cent above the 1860 level.

"There is another significant fact about the price levels of building materials. In

Major Charles W. Bartlett

1860 the level of building materials was 55 as compared with 100 in 1913; whereas the price level of all commodities was 90 in 1860 as compared with 100 in 1913. In other words, the average price of building materials increased nearly 90 per cent in that period of 53 years, whereas the average price of all commodities increased only 10 per cent. What does this marked difference signify? It indicates, we believe, a smaller per cent of increase of efficiency in the industries producing building materials than in other industries. Also, it indicates an increasing length of haul of building materials to the wholesale markets. We know that the average distance of haul for lumber has increased greatly in the last 25 years, and that, with the gradual exhaustion of the timber supply, it will continue to increase.

"There has been a great deal of recent editorial criticism of "combinations in restraint of trade" in the building field. We wonder whether many editorial writers realize that some sort of restraint is economically necessary. Unrestrained competition is economically injurious in any business, as nearly every contractor can testify from bitter experience. The efforts of manufacturers to secure protection from foreign competition are evidence of their belief that unrestrained competition may be ruinous. Without going into the subject of the economic ills and benefits of competition, it will suffice to say that too much competition may be almost as bad as too little. Only the other day the head of the coal miners' union, John L. Lewis, said that one of the crying evils in the coal field is excessive competition, for it lowers the load factor of the average mine and greatly reduces the average number of days worked yearly by the miner. Precisely the same phenomenon normally exists in nearly every field of business—a poor load factor due to excessive competition.

"Among the producers and distributors of building materials there has undoubtedly been some concerted effort to reduce this economic evil, and with it there has probably occurred evils of another nature; but it may be doubted whether the old days of cut-throat competition in the manufacturing of building materials will ever return, for the economic losses from it probably outweigh the losses due to restraint of competition. If so the present house-cleaning will probably be followed by government supervision of restraints of competition, and there will ultimately be no violent changes in the prices of building materials. This will conduce not only to the welfare of the manufacturers and distributors of building materials, and to the workers engaged in construction, but to the public as well."

Sand and Gravel Man Honored

MAJOR CHARLES W. BARTLETT, president of the Kaw River Sand Co., Kansas City, Mo.; Mrs. Bartlett and their daughter, Mildred, left New York on August 3 with an American Legion party of 200 who are going to France as guests of the French government. Major Bartlett is chairman of the distinguished visitors' committee of the legion convention committee. He also is member of a commission appointed by Governor Hyde to acquire a site in France for a monument to Missouri's war dead.

Major Bartlett will go to Paris with the legion delegation and with them to visit Marshal Foch. Then he will go to the American front to select the site for the monument to Missouri's soldiers. Before leaving he said that he had in mind some site in the Argonne-Meuse sector, because it was there that most of Missouri's soldiers, both in the 35th and 89th divisions, fought so heroically.

Both Major Bartlett and his son served with the American Expeditionary Forces in France.

New Georgia Lime Plant

Ladd Lime and Stone Co., Cartersville, Ga., Complete New Lime Plant—Latest Improvements in Shaft Lime Kiln Design

THE accompanying photographs show the new hydrated lime plant of the Ladd Lime & Stone Co., Cartersville, Ga. The plant is located at Ladds, on the Rockmart division of the Seaboard Air Line Railway, about three miles from Cartersville and about 50 miles from Atlanta. The entire plant was completed in January, but part of the plant has been in operation since the first week in September, when four of the kilns were fired and one unit of the hydrating plant was put in operation.

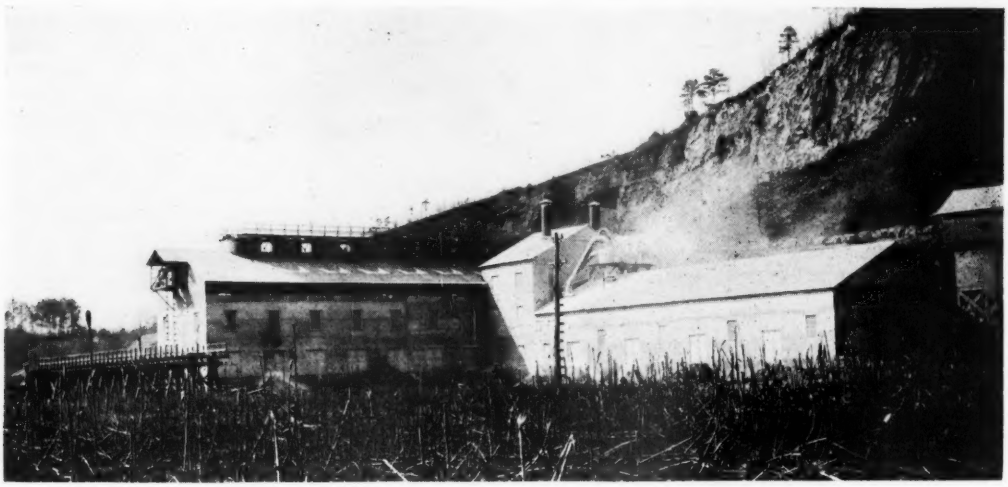


Fig. 1—General view of plant of Ladd Lime & Stone Co., Cartersville, Ga.

The Company a Very Old Producer of Lime

Lime from the Ladd property is well known in the South, although the company has been out of the market for a number of years. Near the present plant are the ruins of several old stone kilns which were built prior to the war. These at one time furnished lime which was extensively used throughout that section of Georgia, and which was considered by the builders and architects of Atlanta to be the best obtainable. The old stone kilns, however, were abandoned some years ago when the plant was purchased by the present interests, the Ladd Lime & Stone Co., which first turned its attention to the manufacture of crushed stone and agricultural ground lime.

Following this line, the first step in the development of the property was the construction of a modern stone crushing plant some years ago and this has been a large producer of crushed stone for concrete, road stone, furnace flux and chemicals, and of limestone fertilizer. The hydrated lime plant was the next step in the development of the property. The plant originally was to consist of four kilns and one hydrating unit, with provision made for doubling the capacity when needed. After construction work was started and the first unit was about half completed, however, it became evident that the demand for a high grade hydrated lime, such as could be manufactured at Ladds, would be much greater than the one unit could supply. It was, therefore, decided to double the capacity of the plant at once by the addition of another unit, instead of leaving this for future development; naturally, the first unit having several months' start over the second one, was completed first and was placed in operation at once without waiting for the completion of the second one.

The lime plant proper consists of eight vertical kilns with all modern improvements. The hydrating plant consists of two hydrating units, each consisting of a Clyde hydrator and Raymond separator, with a combined capacity of approximately 120 tons of hydrate per day. The first unit of the plant was completed late in August, 1920, and the second unit in January, 1921.

The new hydrate is sold under the brand name "Ladco" and has been supplied extensively since the plant was placed in operation to builders and masons in Atlanta and other cities of the South. It has been used both for stone and brick work and also for plastering and stucco.

Quarry

The limestone lies in the large hill which is seen in Fig. 1 rising to a considerable height above the lowlands on which both the crushing plant and the hydrated lime plant are built. The upper strata of the deposit consist of a very hard silicious limestone admirably suited to road material and crushed stone. The lower beds, however, comprise a very pure high magnesian or dolomitic limestone which burns to a clean white lime. This deposit is one of the few, if not the only well located deposit of any size of dolomitic limestone in the far South. The quarry is well opened up and there is a fine face of stone exposed. The amount of overburden and stripping to be removed is slight.

The purity and general character of the stone used for lime is shown by the following analysis:

	Pct.
Silica	0.90
Iron Oxide and Alumina	0.82
Carbonate of Lime	55.76
Carbonate of Magnesia	42.64

The present floor of the quarry is on a level with the top of the kilns and the limestone is carried to the kilns over a steel bridge, as shown in Fig. 2. Small side dump cars with a capacity of approximately 1½ tons are used. The track from the quarry to the kilns is on a slight down grade in the direction of the latter

and the cars are run to the kilns by gravity.

General Layout of Plant

The general layout of the plant is shown in Fig. 1 and is, as will be seen, in the form of an L, the kilns being located on the side nearest the quarry.

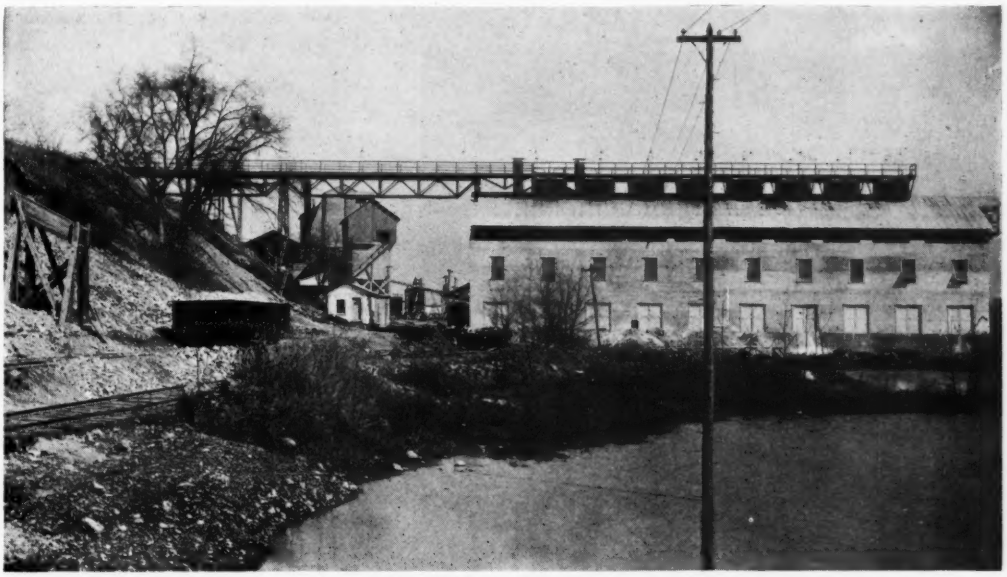


Fig. 2—Kiln building and bridge from quarry

Next comes the hydrating plant and then a large storage shed. The lime plant has its own railroad siding which runs parallel with the storehouse. The coal trestle runs along one end of the kiln building. Water is furnished by a small creek running through the property, and, to show the care with which the new hydrate is made, is filtered to take out mud and silt before being used for hydrating.

The kiln building it 42 x 150 ft., the hydrating building is 45 x 45 ft. and the storage shed 45 x 120 ft. All three buildings are of steel frame. The roofs are covered with corrugated, galvanized iron and the sides with cement-hydrated lime stucco on expanded metal. The foundations are of concrete, including a heavy curb wall entirely around the buildings. The second floors of the kiln and hydrating buildings are of reinforced concrete, while the ground floors are of plain concrete. All stairs are of steel, stair and other railings of pipe and stair treads of Irving's "Subway" grating. All platforms are also of the latter material. No wood has been used in the construction of this plant except for doors and windows.

The machinery on the ground floor all rests on solid concrete foundations and the machinery above this on the steel work of the building. All elevator pits and other excavations are of concrete water-proofed with hydrated lime. These pits have actually been under five or six feet of head water during a flood and proved to be waterproof under this severe test.

The Kilns

There are eight vertical steel-concrete kilns of the flame type. These kilns were designed especially for this plant by the engineers, Richard K. Meade & Co., Baltimore, Md., and embody all of their latest improvements in lime kiln design. The general character of the kiln is shown by Figures 3, 4 and 5. Each kiln consists of a steel shell 11 ft. in diameter and 35 ft. high. The shell rests on a solid pedestal of concrete and terminates in a steel cooling cone. The steel jacket does not extend below the firing floor as with other types of this kiln, the concrete pedestal being built with wooden forms which were made in sections and moved from one kiln to the next, etc.

The kiln is equipped with two fire boxes

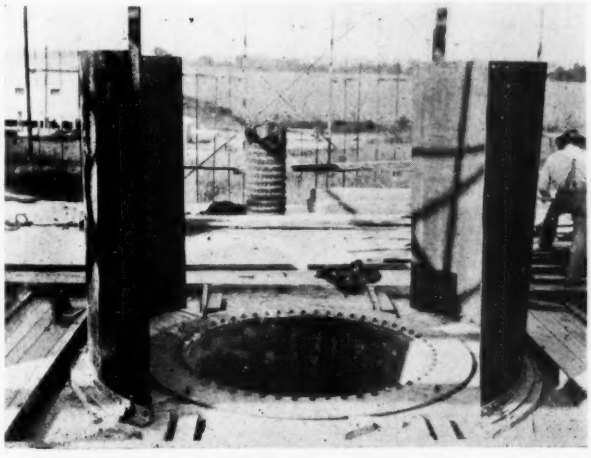


Fig. 3—Kilns under construction

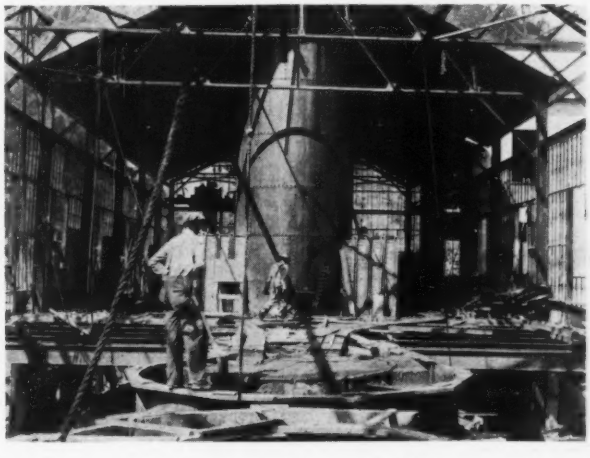


Fig. 4—General view of one kiln

which are built into the sides of the kiln so that the fuel is not mixed with the stone. The fire boxes are equipped with a special type of automatic hand stoker which decreases the fuel economy, insures greater uniformity of burning and reduces materially the labor necessary to fire the kilns. The furnaces are supported on a reinforced concrete floor 12 ft. above the base of the kilns and extending on each side 21 ft. beyond the center line of the kiln giving ample space for the burners to work, for piling coal, etc.

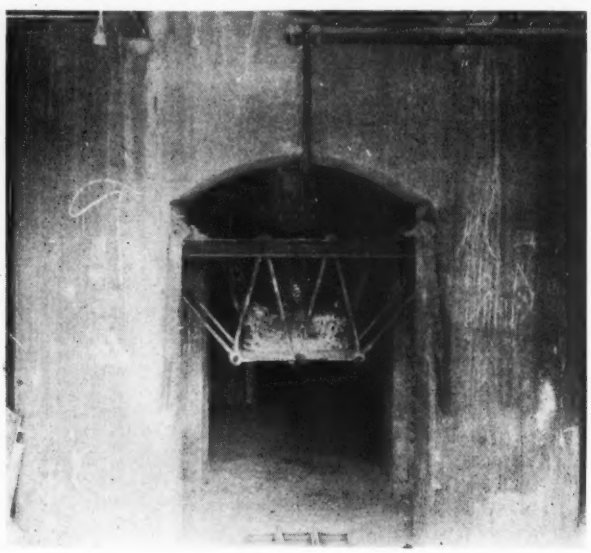


Fig. 5—Cooling cone, doors, levers and kiln pedestal

The shaft is divided into three parts, the upper section of which is unlined with fire brick and forms a bin for the storage of the limestone so that the kilns may be kept supplied at night when the quarry is not working. A heavy steel plate ring protects the top of the brickwork and the walkway and track platform on the top is of perforated steel plate. The middle section of kiln proper is lined with fire brick and in this the stone is burned.

Cooling Cone

The lower section or cooling cone is unlined. It receives the red hot lime from the burning zone and cools the lime by air circulating around the cone. The cone is made in two sections to facilitate removal and renewals and is provided with a special water jacket at the top which prevents burning out at this point and also helps to cool the lime. There is also a poke hole covered by a sliding door. The bottom of the cone is closed by means of a pair of swinging doors which may be adjusted to give a close fit. The doors are not hung from the cone as in other types of kilns, but instead are suspended from a small channel iron embedded in the concrete pedestal. This improvement takes the weight of the doors from the cone and transfer it to the foundation. The doors are swung outward by means of a lever and two connecting rods. The operation of opening and closing is much quicker than when the doors are operated by a rack and pinion. The levers operating the doors are located outside of the kiln and permit the operator to stand away from the dust and heat when the lime is being drawn and there is a clear passageway around the cone. Figure 5 shows clearly the cone, doors, levers operating these and the concrete pedestal on which the kiln rests.

Kiln Design

In designing this kiln certain points have been kept in view, among the more important of which are: (1) To have the structural design of the kiln as simple as possible; (2) to avoid the use of steel except for the shell and cone in order to reduce the upkeep; (3) to provide a quick acting and adjustable drawing device so that entrance of cooling air to the kiln can be kept to a minimum; (4) to cut down the radiation from the kiln shell by the use of a non-conducting lining; (5) to obtain cool lime, and (6) to limit as much as possible the labor of stoking, the entrance of cooling air during stoking and promote uniformity of burning by substituting mechanical for hand stoking.

The coal is brought in on the south side of the plant, as shown in Figure 6, by means of a trestle 137 ft. long with an average height of 12 ft. Located midway along this storage is a bucket elevator. This carries the coal into a small steel bin located on the firing floor of the kiln building. The trestle provides storage for approximately 20 cars of coal. This storage can, of course, be materially increased by trimming the pile.

Hydrating Plant

The lime is conveyed from the kilns to the hydrating plant by means of a pan conveyor running along in front of the kilns and below the drawing floor. It is drawn from the kilns through chutes on to the conveyor.

Arriving at the hydrating plant, the lime is discharged into a steel hopper above a No. 2 Sturtevant open-door crusher, which reduces the lime to ¼ in. and under. The crushed lime is then elevated by means of a bucket elevator into a large steel storage bin in the roof of the building. The bottom of the bin is provided with two openings, each closed by means of a sliding gate operated by a lever. Below each opening is a weighing hopper and beneath this a hydrator. The lime is drawn from

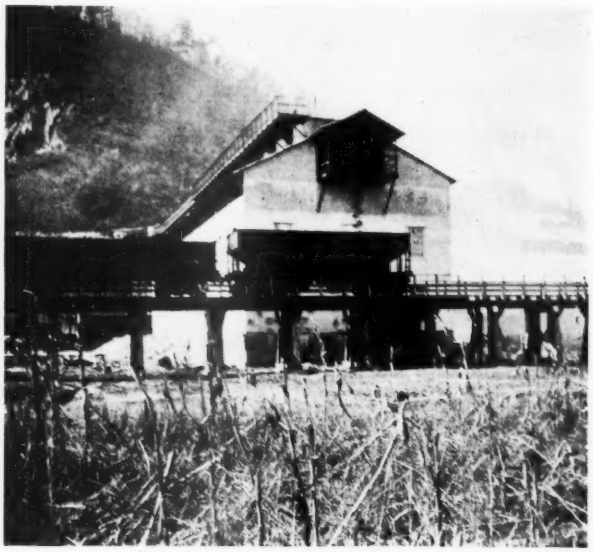


Fig. 6—Coal storage and elevator

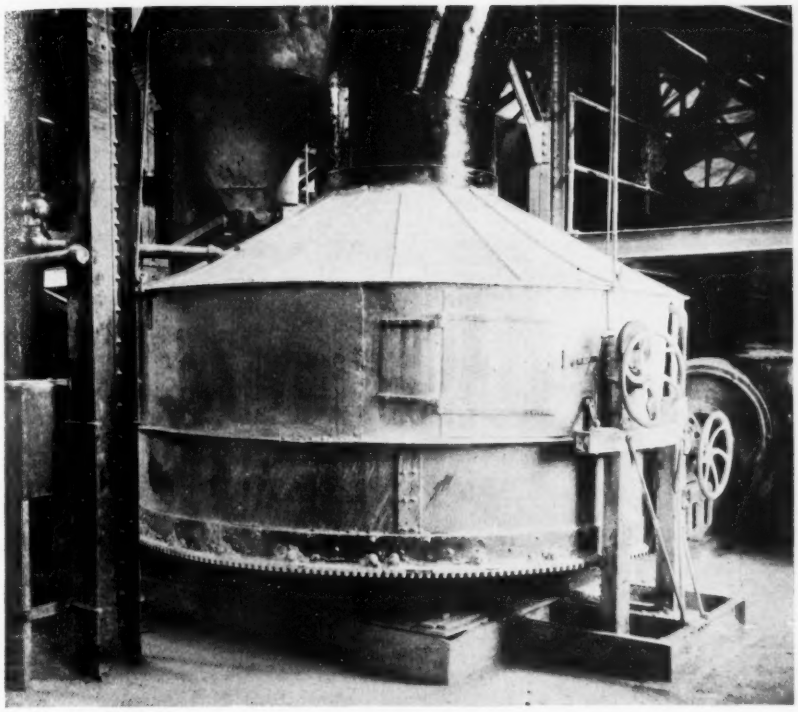


Fig. 7—Clyde hydrator and weighing hopper

the bin as needed into the two weighing hoppers which weigh the charge for the hydrators.

The hydration is effected by means of two Clyde hydrators. Each is driven by its own motor and has its own weighing hopper and measuring tank for water. The hydrators are located on the second floor of the building and are arranged side by side so that one attendant can look after both machines. Figure 7 shows one hydrator and its weighing hopper. The lime is weighed in batches of about one ton and the water is measured by means of a small tank equipped with a special system of valves which can be set to deliver the right amount. The measuring tanks are located in the roof of the building. After the charge of lime has been dumped into the hydrator, the measured quantity of water is sprinkled on the lime.

When the water first comes in contact with the lime no action takes place, but after the lime and water have been thoroughly mixed, slaking begins and the lime is seen to fall to a powder, the excess water being evaporated by the heat formed. The charge swells up considerably and in about 15 minutes the operation is complete and a perfectly dry powder results. This is then dumped into a steel bin below the hydrator.

The fully slaked lime as it comes from the hydrator is in the form of a very fine powder containing occasional pieces of over or underburned lime, silicious cores and some clots of hydrate. The Raymond system is used to eliminate the first two and break up the clots. The hydrate is fed out of the hopper by an automatic feeder into a screw conveyor which carries it to the Raymond system. The latter consists of a No. 1 mill equipped with a No. 11 exhauster and an 8-ft. collector. The mill is located on the ground floor, the exhauster on the second floor and the collector on the roof above the packing bin. The mill is provided with an automatic throw-out which discards from the hydrate the unburned limestone, lime which is not fully hydrated and silicious cores. The mill itself breaks up the clots of hydrate.

The tailings mentioned in the preceding paragraph consisting, as they do, of material high in lime, are valuable as fertilizer. They drop into a small conveyor and are elevated into a bin. From this they are packed as desired and shipped for agricultural purposes.

The mill, automatic feeder and screw conveyor are operated by a motor through belts and a counter-shaft, but the exhauster is direct-connected to its motor. The hopper, pulverizer, feeder and conveyor are shown in Fig. 8. Each hydrator has its own Raymond system. The hydrating plant is consequently in two separate and distinct units, each of which is a duplicate but independent of the other unit. One can, of course, be run without the other.

By reference to Fig. 1, it will be seen that that the collectors are located out of doors, thus saving building space.

The finely ground hydrate free from

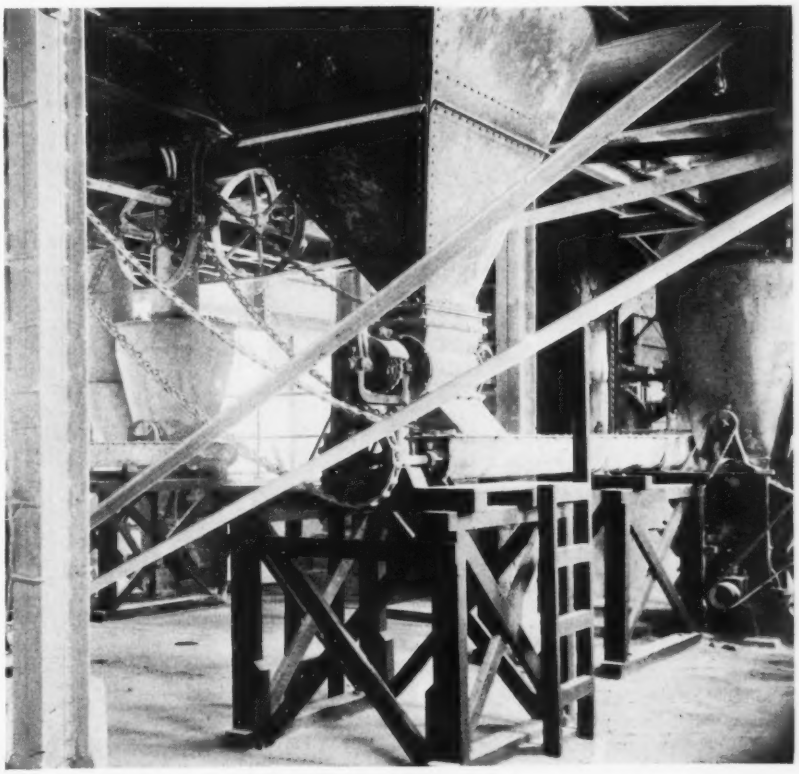


Fig. 8—Hopper, blow hydrator, automatic feeder, conveyor and Raymond mill

impurities is discharged from the collector of the mill directly into the packing bin. The excess air from the 8-ft. collector is led into a small auxiliary collector which also discharges into the packing bin.

Packing

The packing bin is located at one end of the storage shed. The packing is done in Bates valve bags and these are filled by a 4-tube Bates packer. This latter is directed-connected to a small motor which drives it and is equipped with a dust-collecting system in order that the dust may not annoy the packers. This latter system is also arranged so that any spill on the floor can be taken care of. This dust is collected in a third small cyclone collector above the packing bin. One packing system takes care of both hydrating units. Fig. 9 shows the bin and packer.

The floor of the storage shed is on a level with the floor of the cars and the bags are trucked directly from the packer into the cars. A loading platform covered by a roof runs the full length of the shed.

The plant is driven throughout by motors, power being purchased. Each machine has its own individual motor and back-geared motors are used on the elevators.

Construction

All bins are of steel plate construction heavily stiffened to prevent bulging from the load. All are supported on the building frame, obviating extra columns. The elevators are of the chain bucket type and have steel casings. It will be noticed that for the hydrating plant proper only

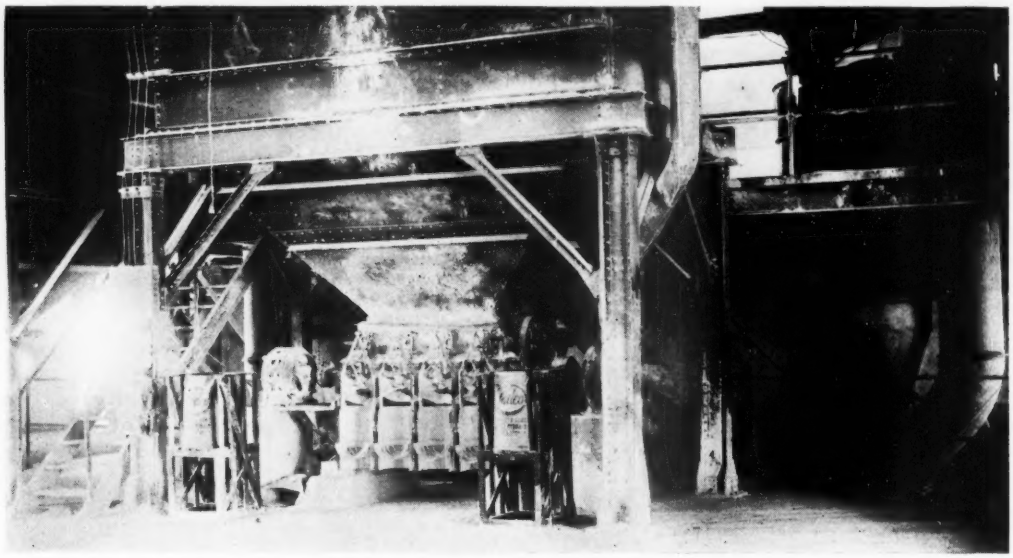
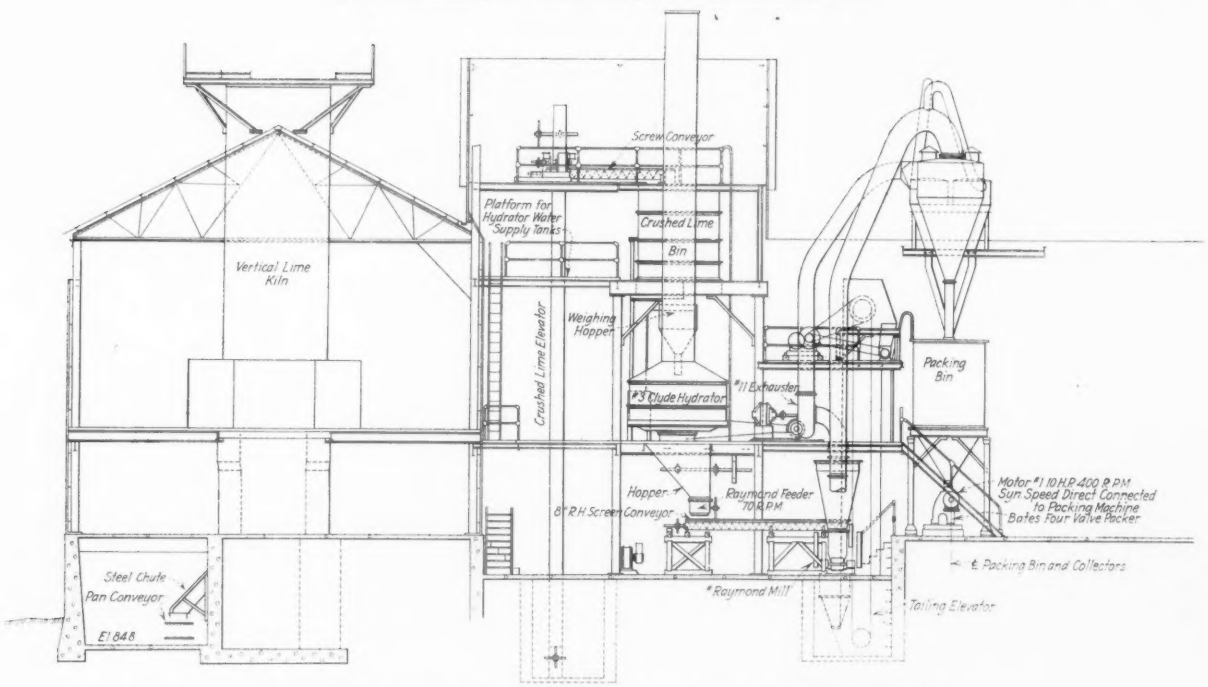
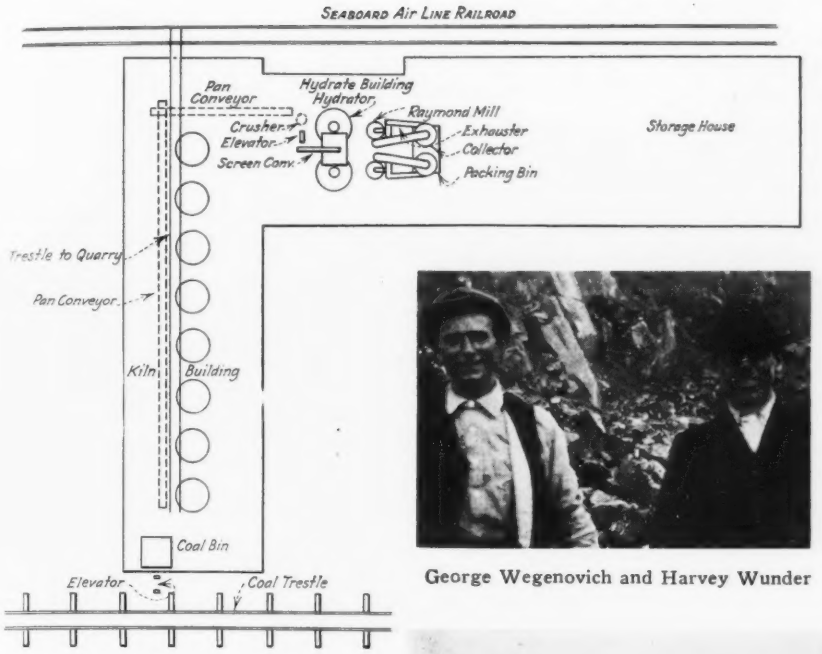


Fig. 9—Packing bin and Bates packer and dust collector



Elevation of the plant of the Ladd Lime and Stone Co., Cartersville, Ga.



Plan of the new lime plant

one elevator is used, namely that from the crusher to the lime bin. Another the bin from which they are packed. The screw conveyors have steel troughs.

The full hydrating plant can be operated by three men and four more will be needed for packing and loading the full output. It is believed that for quality of product and economy of operation, this plant will not be surpassed by any hydrated lime plant in the world.

The plant was designed and built by Richard K. Meade & Co., Baltimore, Md. elevator is used to convey the tailings to Joah Etchells was their resident engineer during the time of construction and placed the plant in operation. The local officers of the Ladd Lime & Stone Co. are L. J. Backus, general manager; E. A. Harding, superintendent, both of Cartersville, Ga. The sales are in charge of E. L. Osborne, with offices in the Hurt Building, Atlanta, Ga.

George Wegenovich and Harvey Wunder

Trap Rock Company's Blast

ON MAY 24, 1921, the Trap Rock Co., Dresser Junction, Wis., made a blast which loosened a quarter of a million tons of rock. Harvey E. Wunder, superintendent of the plant, says:

"This cliff was about 600 ft. long, 65 ft. deep and 85 ft. high; the face being perpendicular. In order to shoot the whole cliff simultaneously we drilled five tunnels at different intervals into the face of the cliff; these tunnels ranged from 60 to 70 ft. in depth. At the end of the main tunnels a 'T' was extended 20 ft. on either side. It was at the end of this 'T' that we placed the powder.

"All in all, this shot required 32,200 lbs.

View of the quarry just before the big blast

View of the quarry after the blast

of dynamite. Each tunnel, naturally, was loaded with different amounts of powder, due to the position and character of the rock. However, they were all loaded in practically the same proportion, as follows:

78%—'Hercules' 40%
18%—'Hercules' 50%
4%—'Hercules' 60%

"The 60% powder was used as a 'kicker' or a primer, while the 40%, which constituted most of the charge, was the lifting agent. Due to the uniformity in the strength of the powder and good judgment in placing the charge this blast did no damage whatever; there were no rocks thrown over 200 ft. from the face of the cliff."

E. E. Simmons, blast expert of the Hercules Powder Co., St. Paul, Minn., office, supervised the placing of the charge and George Wagenovich was the powder foreman for the Trap Rock Co.

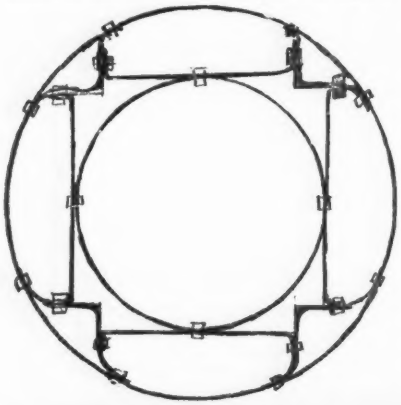
Hints and Helps for Superintendents

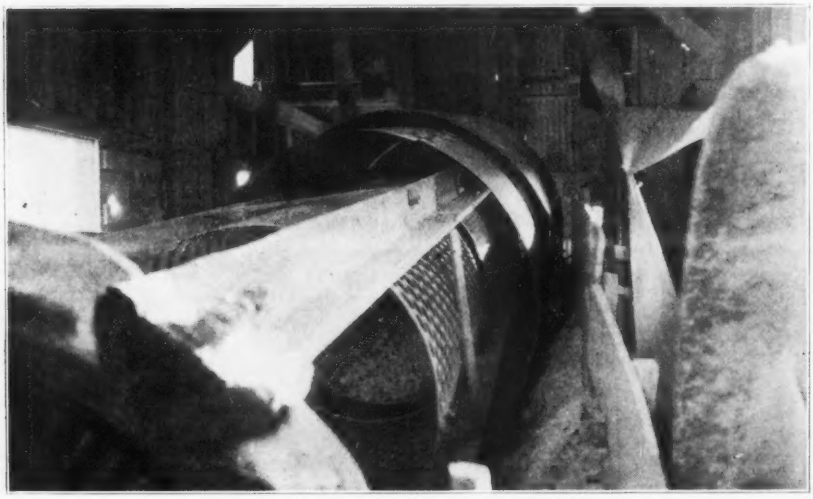
Unusual Screen Design

THE VIEW HEREWITH shows an unusual method of construction of a double-jacketed stone screen. The screen is the closed end type. The screen frame, which holds the semi-cylindrical sections of perforated steel plates, is built of four angle irons, or rather structural steel shapes. The free-hand sketch herewith shows the method of mounting.

The straps which hold the jackets are placed at other points on the angle bars than the straps which inclose the inner screen barrel, as the view shows.

The view also shows how the end screen plates may be detached and moved forward, so that the tailings are discharged from the middle screen section. This is done when there is no market for 2½ or 3-in. stone and it is desired to crush all the material to 1½ or 2-in. size, thus saving the wear and tear on the screen and the inconvenience of putting the 3-in. stone in the bin and taking it out again.





Jacketed stone screen of special design

A Sand and Gravel Screening Problem

A SOUTHERN sand and gravel producer writes as follows:

"We operate a floating sand and gravel plant on our local rivers. Up to this time the deposit of gravel has been sufficiently plentiful to enable us to pick over it and get practically clean gravel with just one stationary screen mounted on about a 45-degree incline. The supply of gravel is diminishing and we are forced to pump some from places where the material is mixed with clamshells, river mud and trash consisting of leaves, sticks and decayed wood. Our present system of screening does not remove the foreign matter from the gravel, neither does it wash the mud from the gravel. When we strike a deposit of this kind gravel comes off the screen coated with mud and mixed with foreign matter, which renders it useless for concrete work and we naturally have to move our operations which causes us to lose lots of time.

"Our plant consists of a barge 30 ft. wide and 115 ft. long, with a 10-in. centrifugal pump mounted on the stern or aft end of the barge, the screen is located directly over the pump, the boilers are mounted fore and aft, midship of the barge, and the capstan engine for moving the dredge is on the forward or front end of the barge. The living quarters for the crew are over all of the machinery; these quarters consist of a house commencing about 20 ft. from the front or forward end of the barge and extending back to the aft end of the barge to the point where the screen is erected, which is 15 to 20 ft. from the stern of the barge.

"If you can suggest any stationary screening device that would give us satisfactory results and deliver to us a clean gravel I would appreciate it. I say stationary screening because we would have to spend considerable money to install a rotary screen."

This problem was submitted to F. M. Welch, chief engineer of the Greenville Gravel Co., Greenville, Ohio, who replied as follows:

"You inquire regarding method of eliminating clam shells, river mud, leaves, sticks and decayed wood from your sand and gravel during your washing and screening process.

"All of these items with the exception of the clam shells we believe could be eliminated by means of an especially designed settling tank similar in principle to the ordinary automatic sand-settling tank but with special features for handling coarser material. We are assuming that all of your trash with the exception of the clam shells will float if the water is agitated a trifle.

"The clam shells, many of which are of similar size to your marketable products, and which will not float in water will be very difficult for you to eliminate and we do not know of any method of getting rid of them outside of hand-picking your material.

"For overcoming your particular difficulty we do not believe that a revolving screen would be of any greater value than gravity screens that you are using."

Wanted—Knotty Problems to Crack!

ONCE AGAIN we urge plant superintendents to tell us their troubles. While our own knowledge of how to meet many operating problems is very limited, our extensive travels generally make it possible to recall to mind some operator who has met and solved most any particular problem.

Our experience and acquaintance with operators give us every reason to believe that they are always willing and anxious to help a brother in distress. Moreover, it is well to point out in this connection that it often saves an operator many times over the consultation fee and traveling expenses if he sends for some recognized expert rather than experiment.

Let ROCK PRODUCTS serve *you* in this connection and let it be a medium of exchange for your ideas.—The Editors.

"Home-Made" Gasoline Locomotive

THE TWO VIEWS presented herewith illustrate a type of home-made gasoline locomotive developed at the plant of the Texas Trap Rock Co., Knippa, Texas.

The motor and chassis for this locomotive were obtained in a rather unusual way. It so happened that a Pierce-Arrow truck passing on a bad road near the plant was mired to such an extent that it was impossible to get it whole, the only undamaged part of the machine being the motor and chassis. The entire machine was offered for sale by the owners of the truck and it then occurred to the superintendent of the Texas Trap Rock Co. that a gasoline locomotive could be developed out of the damaged truck. Accordingly he purchased the machine for a very nominal price.

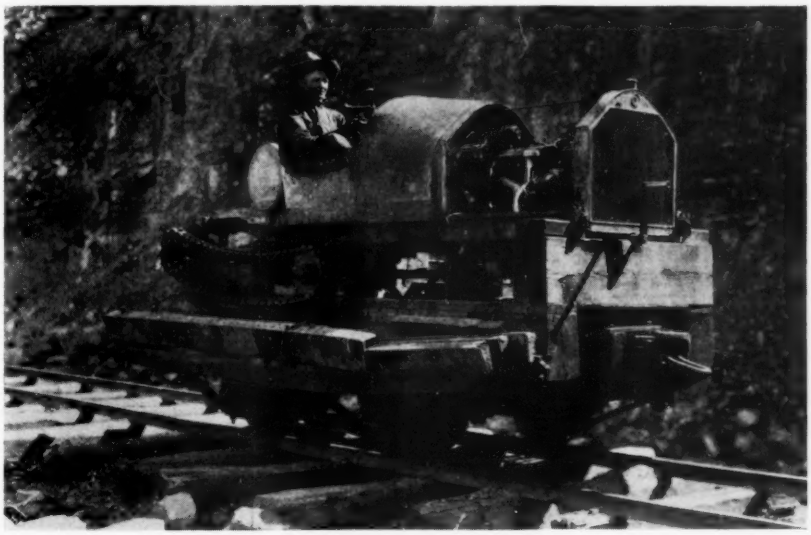
The motor and chassis of the truck were placed on a regular quarry car that had been stripped of its body. The frame of the car was raised by heavy 6x10-in. timbers running along its length and by a cross-beam at either end. On this superstructure was placed the motor and chassis of the truck. An extension was made on the jackshaft of the motor, which is combined with the transmission unit, and 12-in. sprocket wheels attached on either side. Another jackshaft with similar sprocket wheels to those on the first jackshaft was attached to one of the timber supports along the side of the quarry car.

Each of the two shafts mentioned above also had two 6-in. sprocket wheels attached to the inner side of the bearing of the jackshaft. Likewise, two 14-in. sprocket wheels were attached to the journals of the quarry-car wheels, being in line with the small sprockets on the jackshaft. The 12-in. sprocket wheels on each side were linked up with a chain, as were also the 6-in. to the 14-in.

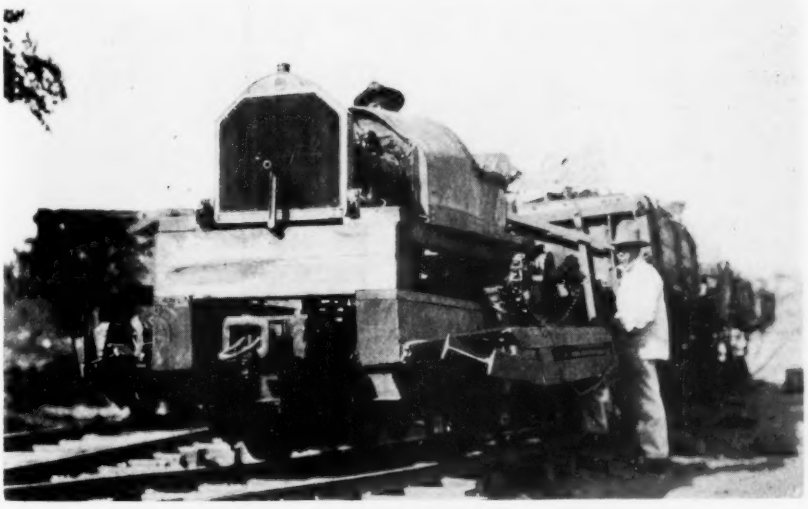
The power comes from the transmission to the first jackshaft, which drives the rear wheels of the quarry car and also the second jackshaft, which drives the front wheels of the car.

This gasoline locomotive runs on a 36-in. gauge track and can haul a 20-ton train very effectively. It was designed and built by H. Graham, superintendent of the plant.

A second locomotive of similar design was built of an old Packard motor truck motor and chassis, picked up in a junk shop at San Antonio.



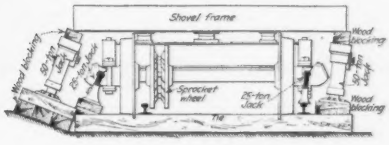
Home-made gasoline locomotive



Another view of the locomotive and a train

Replacing a Derailed Steam Shovel

IN MOVING a 100-ton shovel backward around a sharp curve, the last pair of wheels dropped off on the inside of the curve. Several attempts were made to replace the two wheels, using "A" frogs, switch needles, dipper bases, and similar material, but the ordinary methods that usually suffice for a locomotive or stripping truck all failed. The great weight on this pair of wheels owing to the overhang of the boom and dipper stick makes them very resistant to climbing any description of replacing frog. One frog or the other is invariably pinched out of place.



Replacing derailed shovel

On this particular shovel the sprocket wheel for the chain drive was on this axle and would engage the frog on the inside rail, shoving it out of place before the wheel could engage it.

The method that finished the job in less than half an hour on first trial was the one indicated in the sketch. The jack arms were not used. Blocking the other truck to prevent the shovel moving either forward or back, the dipper was rested on the ground just on the outside of the outer rail. Two fifty-ton jacks were started, one on either corner of the shovel frame, canted to draw the whole body of the shovel toward the center of the track. As soon as the body was free of the boulster, two twenty-five-ton jacks were started at the corners of the journal boxes. As soon as the wheels were clear of the rails, the frame gradually settled, dropping the wheels in place.—H. H. Hunner, in "Engineering and Mining Journal."

Practical Chemistry for Lime and Cement Manufacturers

Magnesium and Its Various Forms, Such as Asbestos, Talc, Etc.

By Richard K. Meade, M. S.
Consulting Chemical and Industrial Engineer, Baltimore, Md.

MAGNESIUM is a metal of somewhat similar properties to calcium and usually found associated with the latter in nature. Magnesium belongs to the zinc family, however, and it does not decompose water as do the metals of the alkaline earths. Its oxide, hydrate and carbonate, however, act quite similarly to the corresponding calcium compounds but the sulphates of the two metals have quite different properties.

Magnesia is not found free in nature but occurs freely as *dolomite*, a double carbonate of calcium and magnesium, $MgCa(CO_3)_2$. The simple carbonate of magnesia also exists as *magnesite*, $MgCO_3$, a mineral found only in this country in workable quantity in California. There are numerous silicates of magnesia among the minerals, of which *asbestos*, *talc* and *serpentine* are well-known varieties.

Magnesium is a metal of silvery appearance which does not alter in dry air. Its specific gravity is 1.7 or less than half that of aluminum. It is malleable and on heating may be drawn into wires or thin ribbons. Magnesia is not altered by damp air but if lit it will burn brilliantly. It is much used in interior photography as a source of light—flashlight powder being finely powdered magnesium.

Magnesia

Magnesium oxide, MgO is formed when the carbonate is heated, the reaction being the same as occurs when calcium carbonate is heated. Magnesium carbonate is more easily decomposed than the latter, however, both as regards temperature and amount of heat required. For this reason dolomitic limes are more easily burned than high calcium limes.

Magnesium oxide is not so readily hydrated as is calcium oxide and when a dolomitic lime is mixed with water a large amount of the magnesia is left unhydrated or in the oxide form. The changes which occur in the burning, hydration and hardening by absorption of carbon dioxide of magnesium compounds are the same as those which occur in the case of similar calcium compounds and the chemical equations of these changes are similar to those given in the preceding articles with Mg substituted for Ca.

Magnesia may be made to have quite different physical properties by varying the temperature at which it is burned. If the temperature is kept only sufficient to convert the carbonate to the oxide a material is obtained which will react with water and with the carbon dioxide of the air. This material is suitable for making magnesia cements, etc. If the calcining is carried on at much higher temperatures, however, the product is a very dense, moisture-resisting and refractory form of magnesia. This is usually known as "*dead* burned magnesite" and is used for metallurgical purposes.

Magnesium oxide is supposed to be detrimental to portland cement and the standard specifications limit the amount which can be present in this substance to 5%. Magnesia is present in natural or rosendale cements, however, in much larger percentages than this and here evidently does no harm.

Oxychloride or Sorel Cement

If a strong solution of magnesium or calcium chloride is added to magnesia, the mass hardens, due to the formation of an oxychloride of magnesia. It is supposed that the compound $5MgO.MgCl_2.xH_2O$ is formed. The exact number of molecules of water is in doubt as various investigators give different figures. It is probable that the hardening is due to the combination of the magnesium chloride and oxide to form a supersaturated solution of magnesium oxychloride, from which solution in turn crystals are deposited, as in the setting if plaster of paris.

This cement formerly known as "Sorel," or oxychloride, cement is now sold under various trade names. It has great strength but is not hydraulic and is acted on by water. This cement is now used to some extent in making plastics when a cement stronger than portland is needed. Its chief use is in making composition floors, stucco, etc. For this purpose the oxide of magnesia (which must be lightly calcined) is mixed with corkdust, asbestos, talc, sand or wood flour and then wet with magnesium chloride solution and the floor laid as where concrete is employed.

These floors are gaining in popularity as they possess some qualities not given to concrete. They take color clearly and may be polished by oiling or waxing. They may be laid in large areas without joints and will not crack. They are highly resistant to abrasion and hence will not dust. The floors are more resistant than those of concrete. These qualities have made floors of oxychloride cement particularly adapted for use in railroad, passenger and Pullman cars and for ships. Oxychloride cements are also used for stucco and where a very quick hardening cement of great early strength is desired.

Dead Burned Dolomite and Magnesite

Both magnesite and dolomite are burned and used extensively for refractory purposes. Like lime, magnesia has a very high melting point. It is also a good heat insulating material. Unlike lime, it is not attacked readily by the moisture in the air and converted to the hydrate. These properties make it an ideal material for lining furnaces. It is now extensively used, either in the form of bricks or granules, for lining open-hearth steel furnaces, copper-converters, reverberatory-furnaces, electric-heating and welding furnaces. At one time magnesia brick were used for lining rotary cement kilns, but now fire-clay brick are used almost, if not entirely, for this purpose.

Magnesia for lining furnaces is made by crushing and burning magnesite in rotary kilns, employing either oil or pulverized coal as a fuel. The temperature employed is somewhat higher than that used in burning lime. A somewhat similar product is also manufactured in the same way by heating dolomite. This is generally sold under the name of "dead burned dolomite." A furnace lining is also made by grinding together a mixture of dolomite and iron ore and heating the same to the sintering point. A material resembling portland cement clinker is so obtained which is used for lining open-hearth steel furnaces. This material stands shipment better than that made from dolomite alone, as the lime in the latter is attacked and hydrated somewhat by the moisture in the air.

A small amount of both dolomite and magnesite are sold for use in the manufacture of paper pulp and liquid carbon dioxide.

Magnesia can be separated from the lime in dolomite. The resulting product

is a light, fluffy form of magnesia suitable for making pipe coverings, oxychloride cement, etc.

Salts of Magnesia

The other compounds of magnesia are not of especial interest to the lime manufacturer. The sulphate, $MgSO_4$, is soluble in water and is commonly called *Epsom salts.* It is used chiefly in medicine and in the textile and tanning trades. It can be made by dissolving either dolomite or magnesia in sulphuric acid, but is generally obtained from natural brines, in which it is often found in considerable quantity. Magnesium chloride, $MgCl_2$, is soluble in water and is used chiefly for making Sorel cement, as has been noted. It is obtained as a by-product from salt brines.

(To be continued)

The Fluorspar Industry

An Important Ally of Limestone for Certain Uses

By Avery H. Reed
Consulting Mining Engineer, Marion, Ky.

FLUORSPAR is one of the important non-metallic minerals. It is essential in the manufacture of opal glass and in the enameling of iron and steel. It is the source for the manufacture of hydrofluoric acid, which is manufactured for commerce, and which is also manufactured on a large scale by the aluminum industry directly for use in the preparation of fluorides necessary for the manufacture of aluminum. Ground fluorspar is the form in which it is prepared and sold for the uses mentioned, and possibly 25,000 to 35,000 tons per year, in normal times, are sold for such purposes.

The bulk of the fluorspar of trade, however, is prepared and sold in gravel form to the steel industry, for use in the manufacture of steel by the basic open-hearth process, and, under normal times, there is used for that purpose 150,000 to 200,000 tons per year.

Foundries, also blast furnaces occasionally, make use of fluorspar in lump form, and a few thousand tons annually are sold generally to such trade.

Previous to about 1900 the production of fluorspar was under 50,000 tons per annum, and was used largely by the chemical and enameling trade, inasmuch as the basic open-hearth process for the manufacture of steel had not developed very far at that time; and the increase in production of fluorspar since 1900 has been on account of the growth of the use of that process for steel manufacture.

In the early history of the production of fluorspar, Western Kentucky was the principal source of supply, and continued so until about 1900, when the Fairview and Rosiclare mines in Illinois both together began to produce about as much as the Western Kentucky field. Beginning with about 1905, the two Illinois mines together began to exceed the Western Kentucky production, and since 1910 the Illinois producers have been by far the largest shippers; in fact, Rosiclare alone has produced occasionally as much as 100,000 tons annually in recent years.

Growth of the Industry

Again, in the infant stages of the fluorspar industry, the manner of producing the mineral was by the crudest sort of methods, from shallow surface workings, open cuts and shafts, and with only such equipment as windlasses and horse whims and log washers; and generally, the labor was mainly under contract, so that there was no incentive to establish permanent mine workings, nor to provide facilitating equipment.

Of course the cost of production under those conditions was low, and so the early established price at which fluorspar was sold on the market was very low. However, I do not believe that the established market price of fluorspar in the early stages of its production should be taken as a reasonable fixed price for the fluorspar mining industry; because, in the beginning of the industry, and with the market price established then, practically no capital was invested in producing the mineral, since generally the property holdings were under lease at small royalty, and the cost of production represented hardly more than the contractors' or laborers' wage.

As matters are now, and have been for the past few years, comparatively large investments have been made in acquiring title to fluorspar properties, in establishing permanent mines, and substantially equipping them. In connection, it may be stated that there is great expense attached to the continued efforts of keeping mine developments ahead of production, and in demonstrating that any particular property will continue to produce over any long period of time. And so in consequence of large invested capital, and because of extended and deeper systematical permanent developments, and costly equipment, productive costs have greatly increased, and there must be another and higher established price fixed for commercial fluorspar. If the industry is to survive, such a price will have to be commensurate with the present greatly increased cost of production.

Present Depression Temporary

Under the depressed business conditions of the country, resulting in readjustment in all commercial lines, following the world war, the fluorspar industry has been practically suspended. Early in the first quarter of this year, virtually all of the fluorspar mines everywhere were forced to close down for lack of orders, and it is not expected that there will be any appreciable sales for the balance of 1921.

Inasmuch as the steel industry is the principal consumer of fluorspar, and that business has been under the greatest depression, perhaps of any big business, there can be no return to normalcy in the production of fluorspar until steel and its fabricated products, is again in normal demand.

It has been stated why it is expected that a fair and reasonable new established price will be commanded by fluorspar in the future; and it is certainly not believed that the price of fluorspar will ever be readjusted to such low prices as prevailed before the war. The mines have closed down, and are idle for the time, waiting for demand again. There will be many producers, no doubt, that cannot survive, and only those that have good and proved properties are expected to survive. By this action of closing down the mines, of course there will not be any appreciable accumulated stocks to sacrifice, even in liquidation of those producers that cannot survive through the present inactive period.

It might be stated as a fact, that during the world war period, and in consequence of the increase in price of fluorspar, there was more incentive than at any time in the past, or perhaps will be in the future, for the effort to discover and develop new fluorspar mines, but that without a single instance known to the writer no new discoveries of importance were made by the extensive amount of prospecting done in the various fluorspar sections of the United States, and certainly no new fluorspar mines of importance were developed; hence, it seems that the production of fluorspar, in the near future anyway, undoubtedly will have to come from the good fluorspar mines already known and developed.

Hydraulic Gravel Operation

Plant of the Mechanicville (N. Y.) Sand and Gravel Company

WHEREVER a sand and gravel deposit lies 100 ft. or more above the washing and screening plant, hydraulic sluicing of the material to the plant seems to be a feasible method of operation. The very large operations near Seattle, Wash., of this type were described in ROCK PRODUCTS about a year ago, and since then the editor has found a smaller but nevertheless interesting operation of the same kind at Mechanicville, near Albany, N. Y.

Here the gravel deposit is in the form of a huge bluff, bordering the Hudson River Valley on the east. Its crest is 185 ft. above the valley floor level and the material stands at quite a steep angle. A plentiful supply of water can be had from wells in the floor of the valley, so that conditions are ideal for hydraulic operation.

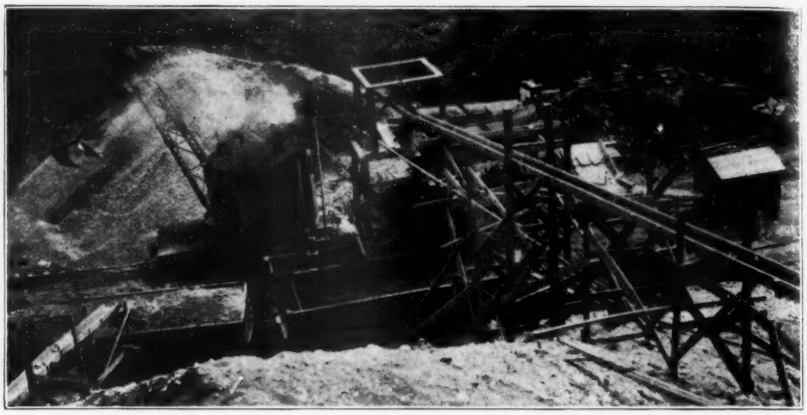
At the time the accompanying views were taken the screening and washing plant in use was a temporary affair, to be soon replaced by a new and complete plant, then under construction, as shown in one of the views. With the temporary plant the material was flumed to the screen, while in the new plant the sand and gravel was to be flumed to a concrete pit and elevated to the screens by a bucket elevator.

This pit or sump is covered with a grizzly to reject the boulders, which are removed with a locomotive crane and crushed in a detached crushing plant. The advantage of the sump, in addition to making it possible to excavate the bank to a lower level, is to serve as a preliminary washing and settling tank.

While this plant was being temporarily operated with two small streams of water from a 6-in. centrifugal the intention was to install a larger pump and employ large hydraulic monitors on the bank excavation. The disadvantage of the smaller streams is chiefly from the danger of cave-ins, because the operators must work too close to the bank.

The material in this case carries a considerable amount of silt and will stand at a nearly vertical slope until undermined. However, in this case hydraulic mining seems especially desirable because of the extra-washing the material receives and because the sand and gravel lie in rather distinct strata and the hydraulic method of mining results in a thorough mixture.

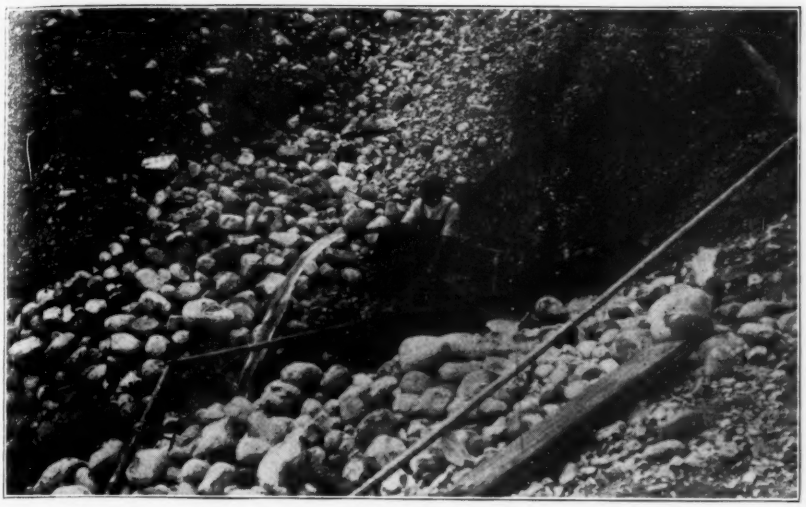
The disadvantage of the hydraulic method in this case is the quantity of good-sized boulders, about the diameter



Plant from above showing locomotive crane for handling stock piles of sand

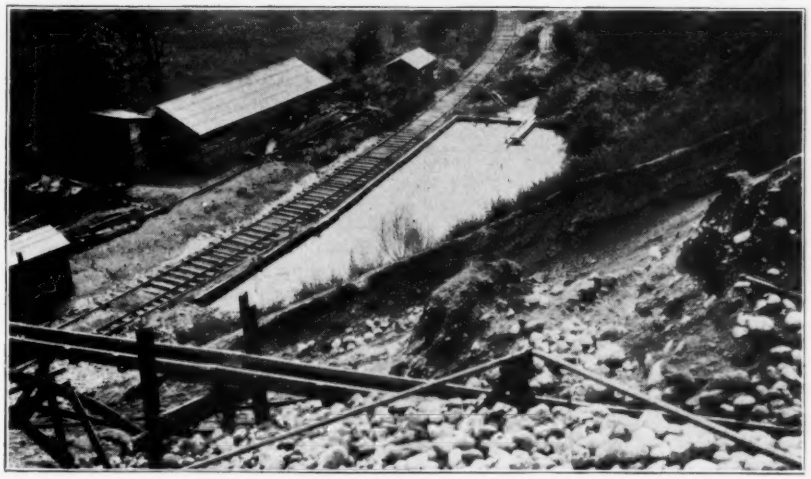
Elevation of plant, showing settling pond in the foreground

New washing and screening plant under construction



Type of nozzle or monitor used temporarily

Another view of the hydraulic excavation



Looking down on the settling pond for recovery of the water used in excavation and sluicing operations—Pump house in upper central part of picture

Two nozzles in operation

of cobblestones, which are not easily handled in a hydraulic operation of such small scale. With large hydraulic monitors and some device for trapping the boulders out of the flumes and dropping them direct into a crusher this would probably be a very efficient operation. In any event this method of sand and gravel operation has not received the investigation from practical operators that its economy under certain condition seems to warrant.

The officers of the Mechanicville Sand and Gravel Co. are: President and general manager, G. Nelson Dulin; secretary, J. B. Hutchins, and vice-president, Lawrence K. Sager.

Enormous Tonnage Hauled Over Country Roads

THE NECESSITY of keeping country roads in good condition is shown by a report recently compiled by the Bureau of Markets and Crop Estimates, United States Department of Agriculture, showing the extent to which they are used in hauling farm products to market. According to the report, which shows the tonnage of 11 products hauled on country roads, giving the yearly average for the period from 1915 to 1919, there were 27 tons of these 11 crops hauled for every 100 acres of land. The average tonnage of the 11 crops hauled on country roads each year amounted to 86,560,000 tons. The 11 crops are corn, wheat, oats, barley, rye, rice, flaxseed, cotton (including seed), tobacco, potatoes and cultivated hay.

Sand Settling and Sand-Settling Devices

No. 6—Quicksand Boxes and Cones

By Edmund Shaw
Allen Cone Co., El Paso, Tex.

THE NEXT CLASS of apparatus to be described makes use of the peculiar properties of the mixture of sand and water called *quicksand*.

A mass of ordinary, dry sand has some of the properties of a solid. One may step on it without sinking deeply. It will offer considerable resistance even to a rifle bullet. If drainage is provided, so that it cannot be washed away, or wet beyond mere dampness, it forms an excellent foundation despite the scriptural reference to houses built upon the sand.

The reason for this behavior of dry sand is that the particles can only be moved by using considerable force to overcome the friction between them.

But if this same sand is mixed with enough water to entirely fill the voids it behaves very differently, and more like a liquid than a solid. The water acts as a lubricant, lessening the friction between the grains. If one steps into thoroughly saturated sand he will sink almost as easily as though he stepped into water, as many an unfortunate traveler has learned at river crossings. Quicksand will flow on a comparatively flat grade, and will run out of a hole in a box or tank. In a word, it is a fluid and behaves as such.

A further word as to the peculiar properties of quicksand may aid in understanding its action in settling apparatus. The percentage of moisture in a quicksand varies with the weight of solids and the percentage of voids. With ordinary sands it is from 25 per cent to 30 per cent, and the specific gravity of such a mixture is around 1.80. With porous material, such as phosphate rock, as much as 40 per cent of moisture may be present and with a sand of very heavy minerals, such as galena, the moisture may be as low as 12 per cent. (These figures are percentages by weight.)

A quicksand may be agitated with a relatively small amount of power, and when so agitated it will float certain substances that sink in water, such as coal, which has a specific gravity of about 1.30.

The grade required for the flow of quicksand in a launder also varies with the substance of which it is composed. A phosphate rock quicksand will flow on two inches to the foot, while a silica quicksand requires about three inches to the foot slope.

The fluidity of quicksand has been used to provide a means of continuously discharging the settled product in the class of apparatus now to be described.

Quicksand Boxes and the Tilting Box

The plain sandbox, having an adjustable discharge gate or valve regulated by hand, is still to be found in use in sand plants. It is probably the oldest form of quicksand device, but attempts were early made to improve it by substituting some automatic regulation of the discharge gate for the constant attention required to regulate the gate by hand.

The oldest method of regulation employs the weight of the settled sand as a controlling force. When a sufficient quantity of sand has been collected the weight of the sand either tilts the settler to one side or causes it to sink. The tilting or sinking motion opens the discharge valve. When the feed lessens in amount the settler rights itself, closing the valve, and hence the discharge opening is regulated according to the feed.

There are many types of tilting sand boxes on the market, some of which have valuable patented features in the way of special valves and the like. One of the best which the writer has seen is in use at the Plainfield plant of the Chicago Gravel Co., and is illustrated in Fig. 10.

For various well-understood reasons, the tilting sand box does not always work satisfactorily. There is a strong tendency to "hang in the corners," and to "channel," allowing more water than sand to pass. With fine sands such devices will hardly work at all. The reasons for this, the effect of pressure, accumulation of a neutral-size product, etc., are, as has been said, well enough understood, but their discussion would take up an unallowable amount of space. But as they exist inventors have tried to overcome them by changing the form and actuating method, retaining the use of the weight of the sand as a controlling force.

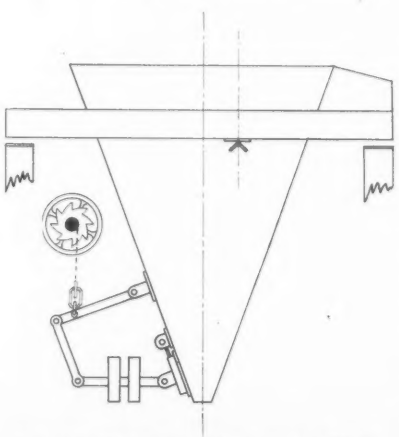


Fig. 10—Tilting sand box used at Plainfield plant of the Chicago Gravel Co.

The Dull Cone

One of the best-known of these newer forms is the Dull cone, invented by Raymond W. Dull and shown in Fig. 11. In this device the weight of the cone is balanced by a counter-weight, as in the tilting forms, and the weight of the settled sand overcomes the counter-weight, causing the cone to sink, and thus opening the valve. As it is free from some of the defects found in the tilting sand box, this cone has found a large use in the sand and gravel industry.

Quicksand Classifiers

So far the devices described are simple dewaterers, their purpose being to settle the sand from the feed stream and discharge it continuously as a quicksand. But in the mining industry such forms were too crude to serve in ore milling, where devices were needed which would *classify* the sand into sizes as well as dewater it.

The simplest form of these quicksand classifiers is the Caldecott cone illustrated in Fig. 12. It consists of a sheet-iron cone with sides about 70 degrees from the vertical, a central inlet and a rim overflow. The settled sand is discharged through an adjustable gate at the point of the cone.

This device was introduced by a famous metallurgist, Dr. Caldecott, in the big South African gold mills. It took the place of enormous sand-collecting tanks, such as were first used to collect the sand for treatment with cyanide solution. The expense of shoveling out these collectors was large, and being intermittent devices they were not in line with modern ideas of industrial engineering. Hence, they were rapidly succeeded by the Caldecott cone and a simple filter

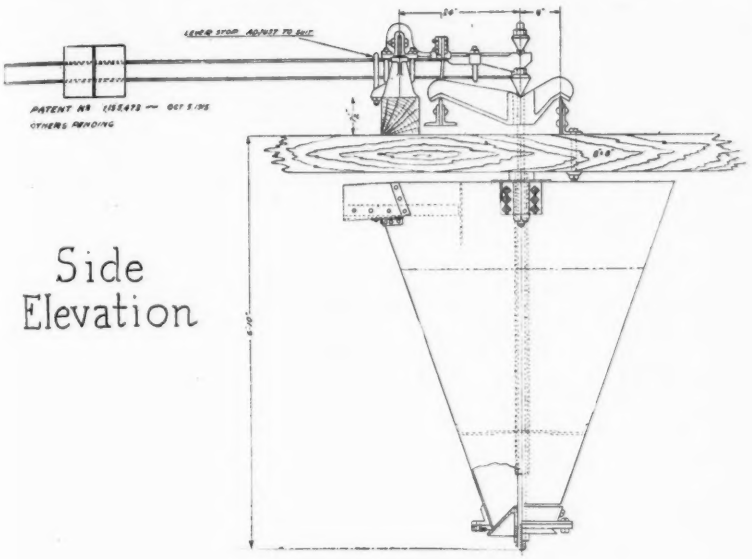


Fig. 11—Dull cone for sand settling

table which drained the quicksand to mere dampness, making sand collection a continuous and automatic process.

The *classification* feature was important in this machine as it was necessary to keep out the fines, which were given a different sort of treatment. Later, when the machine was used with tube mills in grinding the sand to a slime, classification was even more important, to discharge the ground product as soon as it was fine enough and send the coarse oversize back for more grinding. The classification was effected in the sand basin formed in the upper part of the cone. The in-flowing feed stream spread out, losing velocity, and dropping grains in the order of their size, the coarsest nearer the center and the finest nearest the rim. By varying either the current or the area of the basin a split could be made on any desired mesh size.

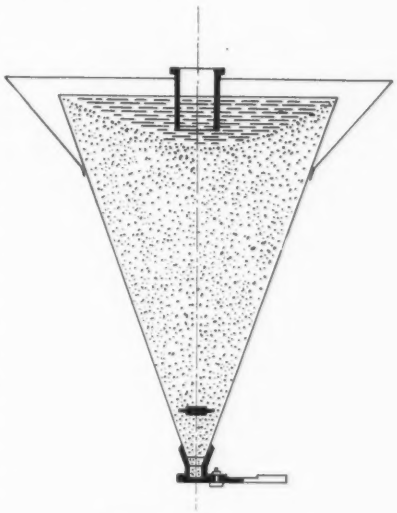


Fig. 12—Caldecott cone

The Allen Cone

The Caldecott cone worked well enough in the mills in which it was introduced as the feed in these mills was unusually uniform and continuous. In other parts of the world where conditions were not so good it was found to require altogether too much attention and gave indifferent classification, so it did not make much headway.

The defects were remedied in the Allen cone, designed by Charles Allen of El Paso, who has invented and patented a great many forms of settling and classifying devices. He found after long study that the fluctuations in the feed of ore mills were so violent and occurred so rapidly that it was impossible to keep up with them by manual regulation. In order to obtain good classification it was necessary that at all times the area of the opening through which the settled sand was discharged must correspond to the amount of sand being fed, and after devising various forms (some of them earlier than Caldecott's cone), he invented the form which is now well known in the mining and allied industries.

The control of the discharge opening is by means of a float in a chamber in the upper part of the cone. When the accumulated sand reaches the lower end of this chamber it causes the feed water to "back up" in the chamber and raise the float. This rise opens the discharge valve by means of the system of levers and rods shown in Fig. 13.

This method of control has been very successful in practice as it is exceedingly sensitive to changes in the amount of solids fed. It is also very positive and reliable in its action, closing the valve promptly with the stoppage of the feed, and this has given the machine a wide use as a simple dewaterer.

(To be continued)

Mineral Aggregate Production in First Six Months

AS TO THE PRODUCTION and shipments of aggregate, both the sand and gravel producers and the slag and crushed stone manufacturers have so far this year enjoyed a rather relatively high degree of activity, says "Engineering News-Record." Slag has shown the lowest production as compared with 1920, the estimate made by the National Slag Association being that for the first six months of 1921, 1,250,000 tons of slag were produced as against 2,500,000 during the same period of 1920

From figures supplied by the United States Geological Survey and the American Railway Association, the estimate is made by the National Association of Sand and Gravel Producers that 23,305,950 tons of sand, gravel and crushed stone were shipped over the railroads during the first six months of 1921. These figures compare with 28,331,200 tons during the first half of the year of 1920 and with 31,823,340 tons shipped during the first six months of 1913. Records show that the 1921 shipments were 82 per cent of those of the 1920 figure and 74 per cent of the 1913 figure. The estimates given for 1913 and 1920 are based on 40 per cent of the production of sand and gravel and crushed stone reported for the entire year, as it is believed that 20 per cent more materials are shipped during the last six months of the year than during the first half. The estimate for 1921 is based on a report obtained from the American Railway Association, which shows that 466,117 cars were loaded with these materials up to July 1, the average loading being approximately 50 tons to the car.

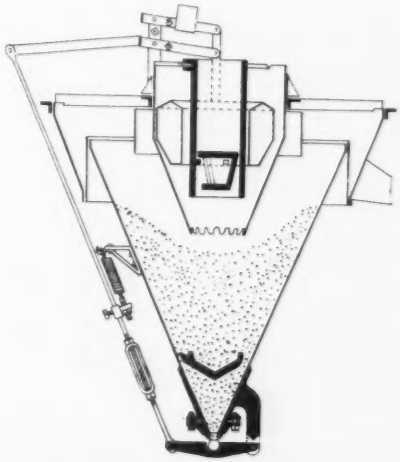


Fig. 13—Allen cone-classifier type

The New Plant of the Oklahoma Portland Cement Company

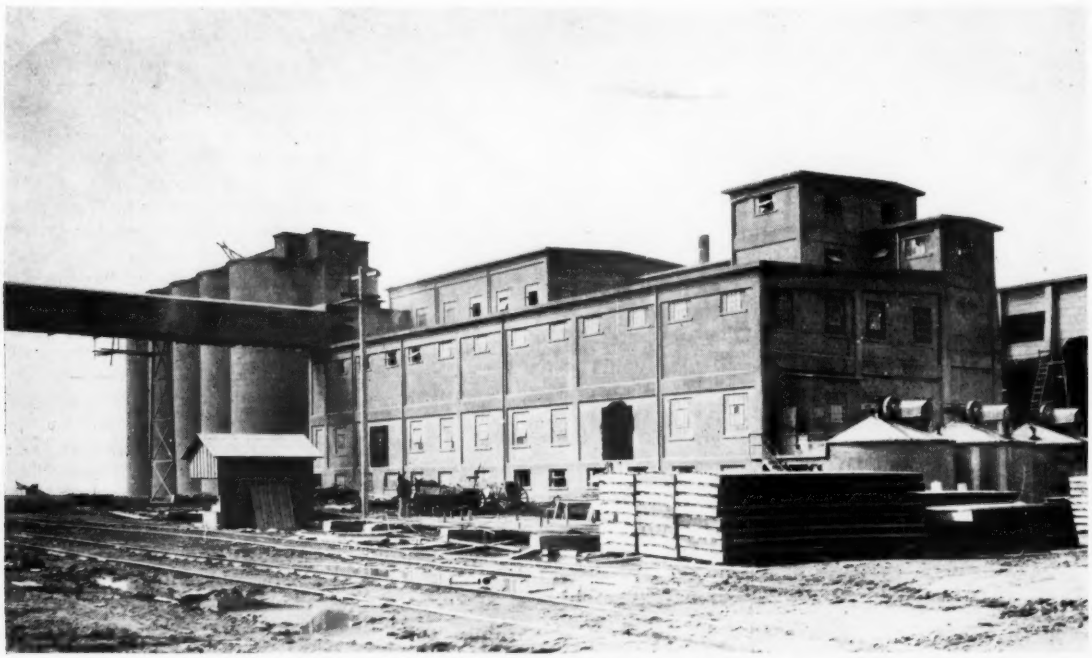
Continued from the July 30 Issue

THERE are two deposits of shale on the premises opposite the stone quarry; one consists of a blue shale and the other of a yellow clay. In both cases the material is stripped from its benches by a 60-ton Marion steam shovel with a 1¼-cu. yd. dipper. The material is loaded direct into the side-dump gondola cars and hauled to the cement plant in conjunction with the stone. About 15 cars of shale are loaded daily.

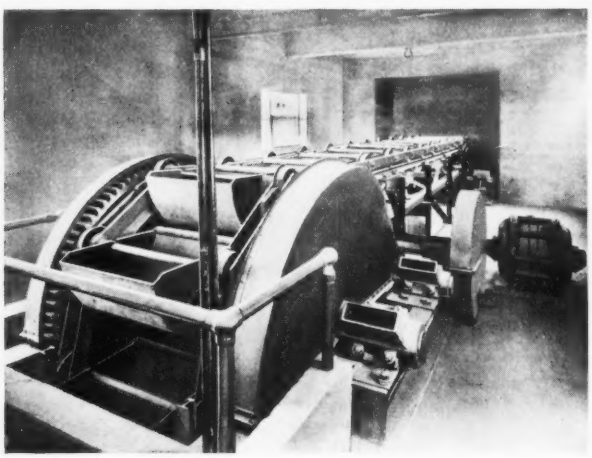
Raw Storage

As the material enters the ground to the new plant it is hauled on a two-per cent grade embankment and concrete trestle to an elevation of 28 ft., entering the raw material storage building, which is 300 ft. long, 80 ft. wide, and 70 ft. high. A 20-ft. bay in the center of the building is used as a proportioning department with adjoining rock and shale storage.

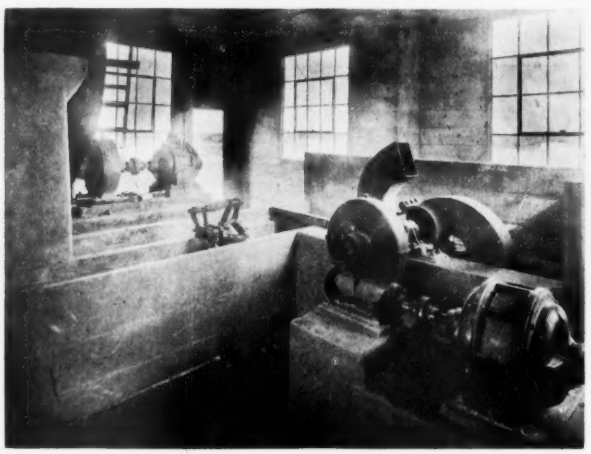
The approximate capacity of the building is 15,000 tons of rock and 18,000 tons of



Raw and finish grinding building—Conveyor on left leads to cement stock house—Clinker storage in rear



Limestone and shale bucket carrier



"S" type slurry feeder direct connected to motor through worm gear reducer

shale. The proportioning department has an additional stone bin and shale bin on either side of it, with a capacity of 850 and 250 tons respectively.

Proportioning

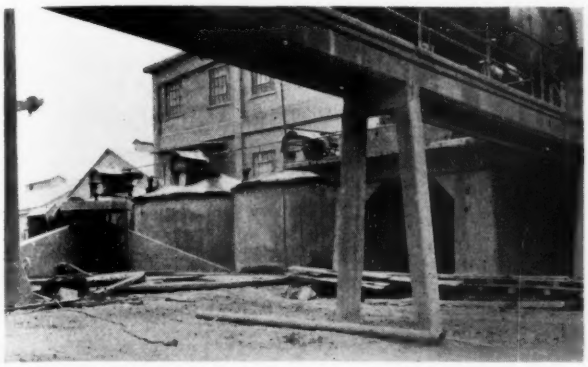
A 15-ton direct current electric overhead traveling crane, provided with a 4 cu. yd. clam shell bucket, is used to reclaim and distribute the material to its respective storage bins inside the raw material storage building. It also reclaims the material from these bins and feeds it to the stone or shale bin of the proportioning department. The stone bin is arranged so that it feeds the stone by gravity to a Schaffer poidometer, as is illustrated in one of the accompanying photographs.

The shale is passed through a 36 in. by 36 in. double roll disintegrator, with discharge running into the shale bin that feeds the second poidometer. Each poidometer is direct connected to a 5-hp. motor, and is set every two hours, thus preparing a mix within 2 to 5 per cent correction.

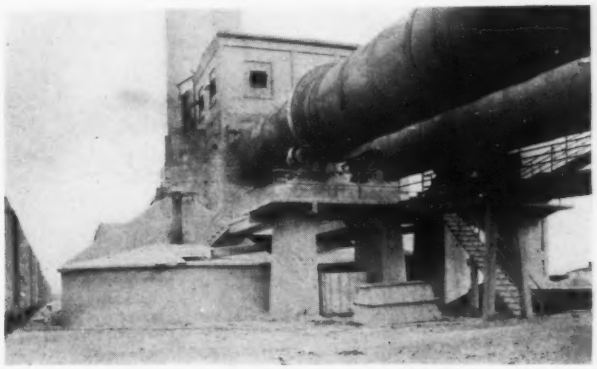
Raw Grinding

From the poidometers the proportioned material is conveyed and fed into the top run of a 24 in. by 24 in. Perkins pivoted bucket carrier, and conveyed through a tunnel of 250 ft., elevated to a height of 45 ft. and deposited into the raw storage bins above the compeb mills, of which there are two, with provisions made for a third. The bins above the compeb mill have a capacity of 600 lbs. each. From the bins the material is fed by a 30-in. cradle feeder into a No. 726 compeb mill. The mills are direct connected to 450-h.p. synchronous motors through 60 in. magnetic clutches.

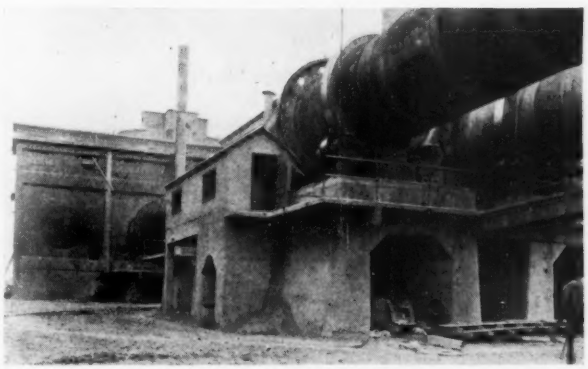
The rock and shale are fed into the mill through its trunnion bearing, with a continuous flow of water. It is discharged as slurry through the trunnion bearing at the discharge end of the mill and enters into a trough, through which it flows by gravity into a set of three batch tanks. The batch tanks are 20 ft. in diameter and 14 ft. high, with an approximate capacity



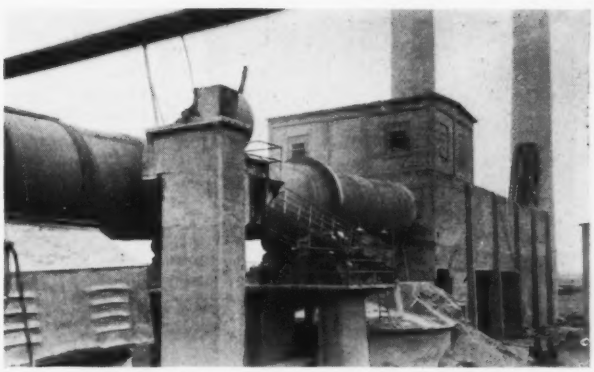
Batch and mix tanks for slurry



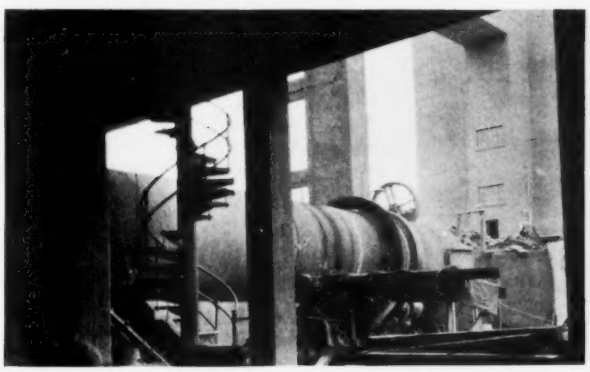
Slurry storage basins for kiln feed



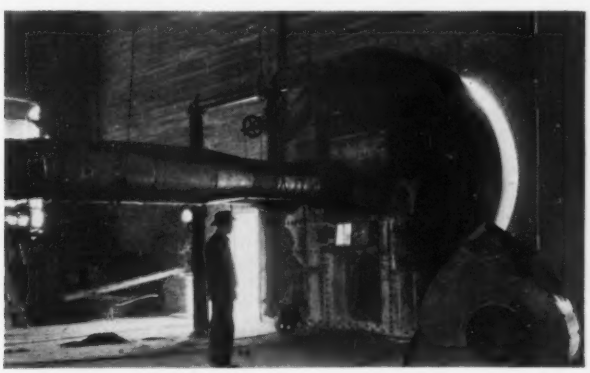
Kiln drive—Note provisions for additional kiln



Feed end of kilns—Slurry basins in foreground



Rotary cooler for clinker



Ncte expansion joint and "Y" where gas and air mix

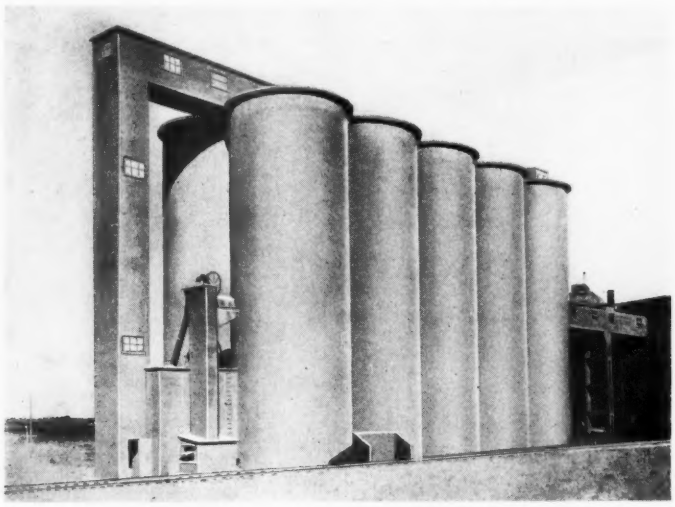
R. C. Rodarmel, superintendent

of 400 bbls. each, and are also provided with mechanical agitators and air lift. From these batch tanks the chemist makes his lime analysis for the proper proportioning of his mix, which he feeds to the mix basins. The accompanying drawings show only two mix basins, but a third has been added since. The mix basins are 34 ft. in diameter, 14 ft. deep, have a capacity of 1,000 bbls. each, and are of similar construction to the proportioning tanks.

The resulting mix is fed to an elevator pit, from which it is picked up, elevated and discharged into a trough that empties into two slurry storage basins 34 ft. in diameter, 22 ft. high, located underneath the feed end of the kilns. These tanks are also provided with mechanical and air agitation, thus insuring a perfect mix. They have a capacity of 2,000 bbls. each. The agitating devices on all the slurry tanks are the new Dorr process, designed and installed by the Dorr Co., New York City.

The slurry from the storage basins is picked up by two elevators and deposited in the kiln feed trough. On the addition of the third kiln, a third elevator will be supplied. At present there are two troughs one for each kiln, provided with an overflow. From these troughs the slurry is picked by means of a scoop, or "S" type, feeder with a side center discharge and fed through an 8 in. pipe into the kiln.

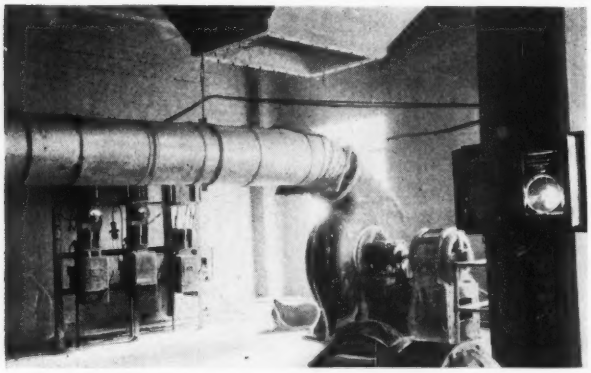
The scoop feeders are directly connected to 5-h.p. variable speed motors by worm reduction gears. The speed of the motor is controlled by the burner in the kiln room. This is accomplished by means of signals and indicator dials. The amount of feed is controlled by increasing or decreasing the speed, according to the notches on the controller switch.



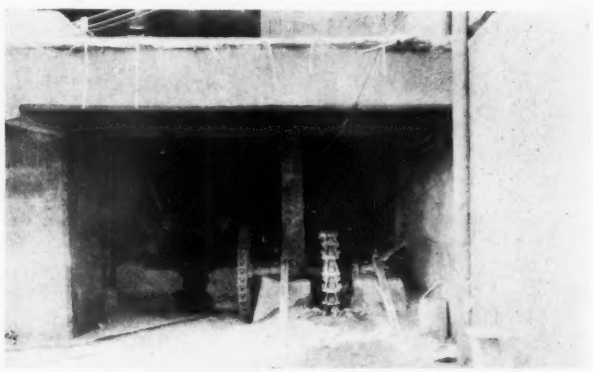
Reinforced concrete clinker storage bins

Kilns and Coolers

The kilns are 240 ft. in length, 10 ft. in diameter, and rest on four tires, direct-connected through gear reducers to 100 h.p. variable speed motors. There are two kilns at present, with provisions for a third. The kilns have a 6-in. concrete lining for 40 ft. from the feed end or evaporating zone of the kiln. The evaporating zone is also equipped with lifter plates, eight rings of four plates to a ring, 5 ft. long, spaced 45 degrees apart, forming a spiral to pick up the slurry as it enters the kiln and let it drop across the cross sectional area into the passageway of the outgoing waste heat gases. The gases as they leave the kiln are passed into a dust chamber 135 ft. long with a cross-sectional area of 200 sq. ft. The



No. 10 blower furnishing air for kiln—Pyrometers for measuring stack gases



Drag conveyor for temporary handling of live clinker

gases enter into a concrete stack 9 ft. in diameter and 270 ft. high, there being one stack for each kiln.

In the design of the first dust chamber the company made provisions for its use as a saturator in case it decided to install a potash recovery plant. In the design of the second dust chamber the company abandoned the idea of a potash recovery plant, because of the expense involved in recovering the potash.

The clinker from the coolers discharge onto a reciprocating conveyor feeding a pit and elevator boot, from which it is picked up and elevated to a height of 65 ft. and discharged into a clinker measuring device. This machine registers every barrel of clinker turned out and feeds it into the top run of an 18x24-in. pivoted bucket carrier, which conveys the material to the clinker storage.

Clinker Storage

The clinker storage consists of 10 concrete silos, 26 ft. in diameter, 85 ft. high, having an approximate capacity of 110,000 bbls. This type of clinker storage has among its advantages that of insuring absolute reclamation of clinker without any great cost involved; also, due to heavy rainfall in that section of the country, a closed clinker storage is necessary; with the addition that it is claimed that the closed storage for clinker insures a more perfect chemical combination of the constituents of clinker, reduces quick initial setting and improves the grindability of clinker.

charging into the gypsum storage. The gypsum storage has a capacity of 1,000 tons. The Oklahoma Portland Cement Co. operates its own gypsum mine at Ideal, Okla.

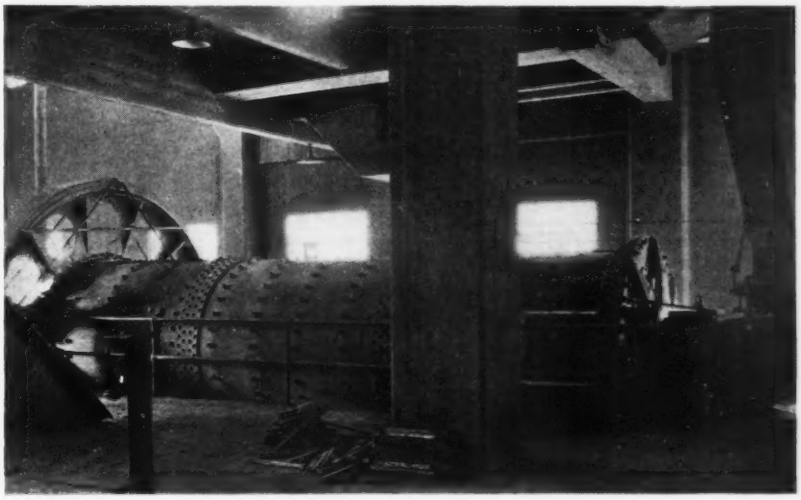
Finish Mill

Each compeb mill has its own gypsum and clinker bin overhead. The bin is sub-divided into two compartments, one of 125 tons' capacity for clinker, the other of 30 tons' capacity for gypsum.

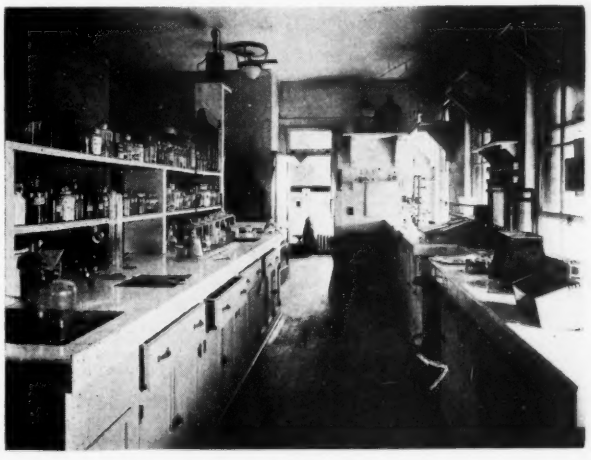
The clinker is drawn out of the bin by gravity, entering an automatic cradle feeder which feeds it into the dry compeb mill. The gypsum is added at the same time by a ratchet feeder mechanism which is controlled by the feeder on the compeb mill. Thus as the feed of clinker to the compeb mill is increased, the feed of gypsum is increased correspondingly. This gypsum feeder is of the company's own design.

The compeb mills in the finish grinding department are identically the same as those described in the raw grinding, with the exception of being direct-connected to 500-h.p. synchronous motors through 60 in. magnetic clutches.

The product leaving the compeb mills goes direct to an Emerick air separator which is installed in combination with the compeb mills. (This type of air separator was dscussed at length in the Jan. 1, 1921, issue of Rock Products.) The fine particles from the air separator are discharged into a screw conveyor, which feeds the material into an elevator boot, from which the final product is elevated and discharged onto a 24-in. belt conveyor that takes the cement to the stock house. The coarse particles from the air separator are by-passed into a scoop conveyor, from which it is returned to the compeb mill for further reduction. The compeb mills are so arranged that they can be operated with or without the air separator.



Compeb mill for finish grinding

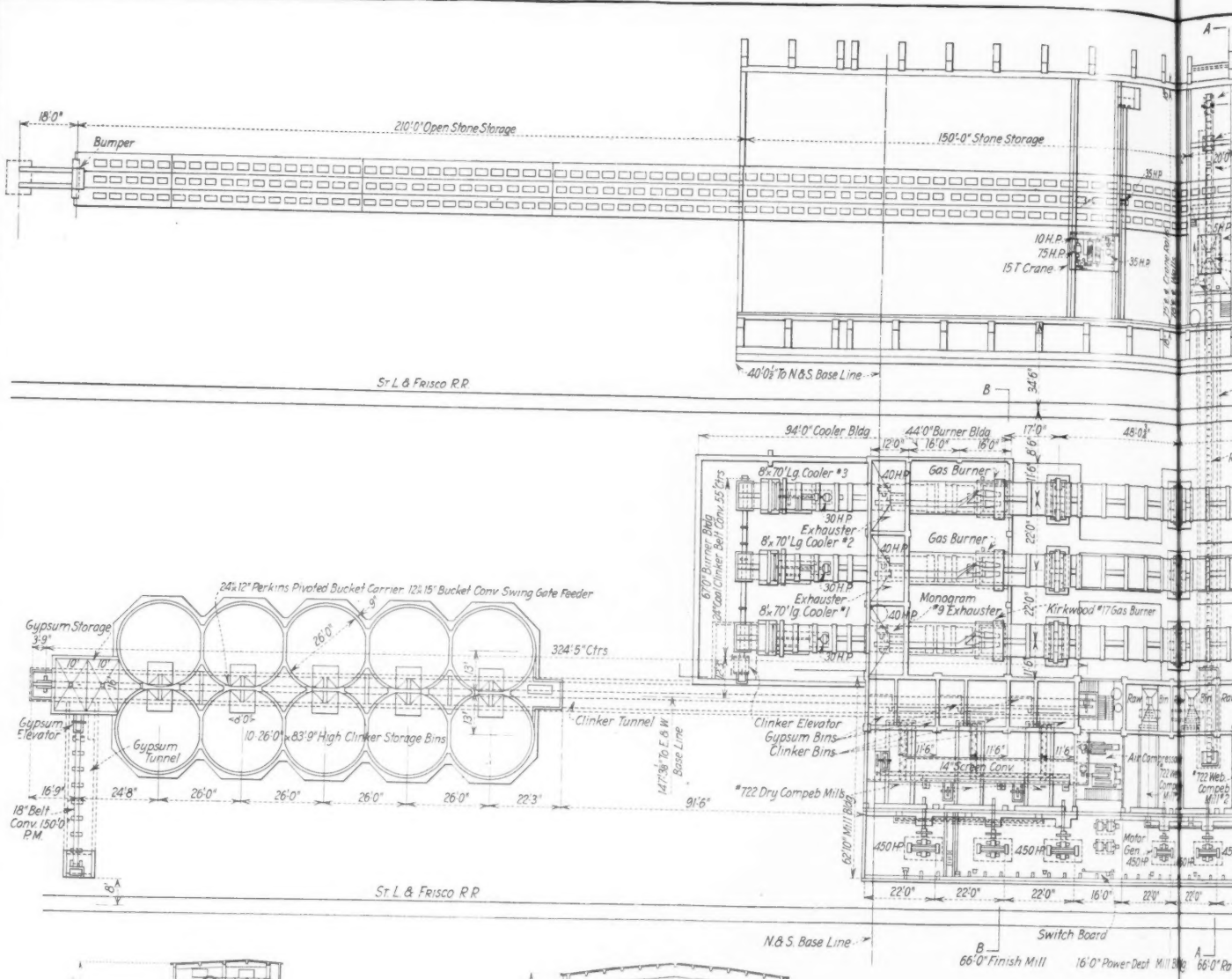


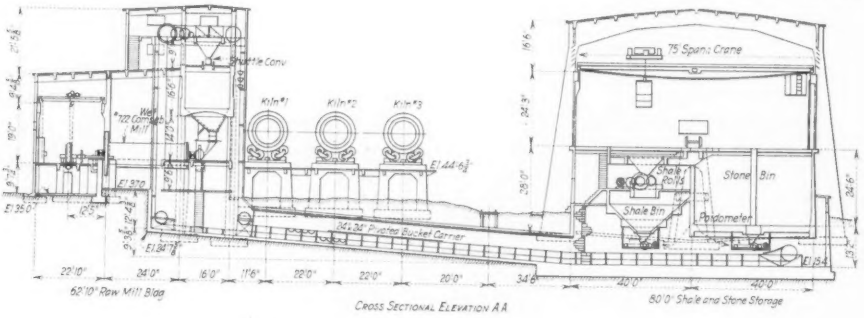
View of chemical laboratory

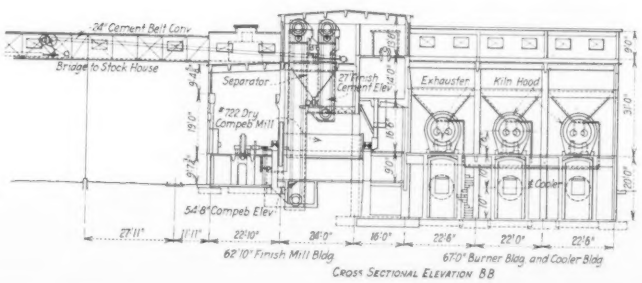
Locker and wash room for employes

The 12x24-in. pivoted bucket carrier on its return run comes under the silos and withdraws the clinker and gypsum from the silos and conveys and elevates them to the top of the compeb mill clinker bins.

The gypsum is unloaded from the railroad tracks adjoining the clinker storage into a hopper feeding an 18-in. belt conveyor running in a tunnel. The belt conveyor deposits into a bucket elevator dis-



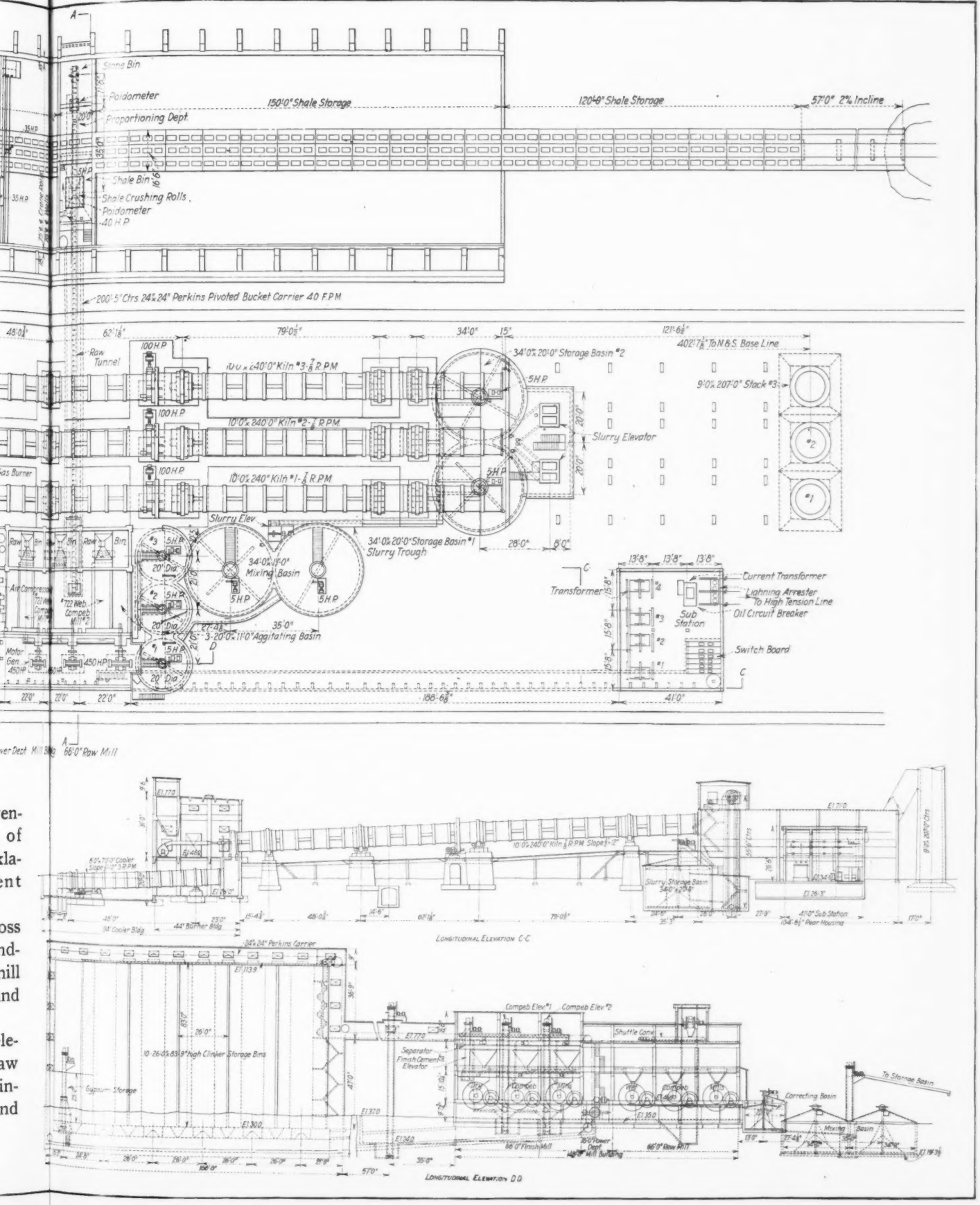




TOP PLAN shows general arrangement of entire new plant of Oklahoma Portland Cement Co., Ada, Okla.

Plan to left shows cross section through raw grinding department, finish mill building and burner and cooler building.

Plan to right shows elevation of kilns and raw and finish mill building, including slurry basins and clinker storage.


Stone Bin
Poidometer
Proportioning Dept.
150'0" Shale Storage
120'0" Shale Storage
57'0" 2% Incline
Shale Bin
Shale Crushing Rolls
Poidometer
40 H.P.
200'5" Ctrs 24"x24" Perkins Pivoted Bucket Carrier 40 F.P.M.
Raw Tunnel
100 H.P.
10'0"x240'0" Kiln #3 - 7/8 R.P.M.
10'0"x240'0" Kiln #2 - 7/8 R.P.M.
10'0"x240" Kiln #1 - 7/8 R.P.M.
34'0"x20'0" Storage Basin #2
402'7 1/8" To N.B.S. Base Line
9'0"x207'0" Stack #3
5 H.P.
Slurry Elevator
Slurry Elev.
34'0"x20'0" Storage Basin #1
Slurry Trough
34'0"x11'0" Mixing Basin
3-20'0"x11'0" Aggitating Basin
Transformer
Sub Station
Current Transformer
Lightning Arrester
To High Tension Line
Oil Circuit Breaker
Switch Board
66'0" Raw Mill
Longitudinal Elevation C-C
24"x84" Perkins Carrier
10-26'0"x83'9" high Clinker Storage Bins
Gypsum Storage
Compeb Elev. #1
Compeb Elev. #2
Shuttle Conv.
Separator Finish Cement Elevator
Correcting Basin
To Storage Basin
Mixing Basin
66'0" Finish Mill
66'0" Raw Mill
Longitudinal Elevation D-D

The belt conveyor to the stock house is equipped with a weightometer, which weighs the quantity of cement on the belt. This is an accurate means of keeping record of barrels of cement produced. This machine also operates a solenoid applied to the gypsum weighing device at the feed end of the compeb mill, which feeds the proper quantity of gypsum according to requirements as every barrel of cement is weighed off. The belt conveyor runs only half way to the stock house, depositing into a screw conveyor which finally discharges the cement into the stock house of the old plant.

The company contemplates building a new stock house in the near future, which will be similar to the clinker storage described above. The stock house will have a capacity of 100,000 bbls.

Fuel

The drawings accompanying this article show provisions for a coal pulverizing plant, but natural gas is still in abundance, and as a fuel it is excellent. The natural gas is reduced to a 4-oz. pressure, and enters the kilns through two gas burners, in which a blast of air at a 6-oz. pressure commingles with the gas and forces the fuel into the kiln. The air is furnished by a No. 10 blower.

Power

The entire new plant is electrically driven, and power is furnished to the company by the Oklahoma-Shawnee Power Co., Byng, Okla. It enters the company's substation at 33,000 volts through a set of four 1,000-k.w., 3-phase transformers.

Two 100-k.w. motor generator sets furnish direct current for operating the overhead electric crane in the stone storage and for excitation of the synchronous motors connected to the compeb mills.

A 10x2-cylinder low-pressure air compressor furnishes the air for slurry agitation, while another single-cylinder air compressor furnishes the air for power purposes.

The power required for two units is in the neighborhood of 2,000 k.w. and it is estimated that 2,750 k.w. would be sufficient for operating three units.

Personnel

The officers of the Oklahoma Portland Cement Co. are Charles Boetcher, president and treasurer; R. J. Morse, secretary and general manager; O. Mathews, manager at Ada; R. C. Rodarmel, plant superintendent, and O. A. Bayless, chief chemist. The designer and chief engineer of construction of the plant was Wm. C. Rieth, who is now chief engineer for the Southwestern Portland Cement Co., Los Angeles, Calif.

A Correction

IN THE ARTICLE in Rock Products, July 16, page 28, describing the new plant of the Giant Portland Cement Co., D. C. Findlay was referred to as having had a hand in the design of the Oklahoma Portland Cement Co.'s plant at Ada, described above. Mr. Findlay has asked us to make the following correction:

"An unfortunate error was made in connecting D. C. Findlay's name with the Oklahoma Portland Cement Co. mill. This should have read the Vancouver Portland Cement Co. As is widely known, W. C. Rieth was the engineer responsible for the design and construction of the Oklahoma mill."

Cement Production from Slag in Electric Furnaces

Swedish Development of Commercial Importance

H. G. WENNERSTROEM, a Swedish engineer, has experimented for the past two years with the production of cement from blast furnace slag by means of electricity, has thoroughly tested a new procedure and reported on the process in the Swedish Society of Technology, Division of Chemistry.

Former attempts in this field remained without practical significance on account of the difficulty of preventing the formation of calcium carbide during the process. Wennerstroem uses slag as part of his raw material, that is, silicious fluxes, from smelting processes, and lime. The steel works at Dornnarfoet, Sweden (Stora Kopparbergs Bergslag A. B., Falun) erected a special cement laboratory, and experiments on a large scale proved so satisfactory that a larger mill of 250,000 barrels annual capacity is now in the course of construction.

It proved most economical to use the liquid slag as it comes from the furnace; the process is cheapened by this means since the current used for fusing is reduced. The electric furnace is fed with graphite or coal; to insure an equal distribution of current it is cylindrical in form and of rather large diameter so that the electrode which is hung perpendicularly into the fluid bath shall be very much closer to the bottom than to the sides of the furnace.

The consumption of the electrode itself, especially in the case of a graphite electrode and well burnt lime, is very little. During a 10-hour run under these circumstances a graphite electrode 300 mm. in diameter lost 10 mm. in length with a very slight reduction in diameter. To prevent the formation of the carbide care must be taken to have the electrode constantly submerged and that a luminous arc is not formed. This is, however, easily done. With the addition of the necessary quantity of lime and after the fusion is complete, tapping takes place. If the fused mass is run into suitable carts and air cooled, it disintegrates very rapidly into very fine light colored flour. This cement requires little or no grinding. If, however, the fused cement is granulated by running into water, a product is obtained after drying which is very much easier to reduce than ordinary cement clinker.

The power consumed amounted in the case of hot slag to 400-700 kw. to 1,000 kg. cement. The compression tests on the granulated product in mortar mixes of one part cement to three parts standard sand showed a maximum of 582 kg. per square cm. after seven days and 740 kg. after 28 days. The air cooled cement showed respectively 260 and 400 kg. per square cm.

The time of initial set as with ordinary cement could be controlled by the addition of gypsum, usually added in the tube mill. At times the addition of gypsum was quite unnecessary. Through fusion the cement is of greater value than coked cement. The iron usually occurring in blast furnace slag collects at the bottom of the furnace and can be separated by tapping. Even when slag from manganese steel production and containing 11 per cent of manganese was used, Wennerstroem succeeded in getting good cement, adding 25 per cent of lime. Most of the manganese was recovered.

This method of cement production is a very economical one since in Sweden steel mills usually have unlimited electric power at low rates at their disposal. The plant required consists of the electric furnace and the reduction mill, the latter very much smaller since crushers and tube mills can be dispensed with.

In the production of petroleum from the oil-bearing slates of Sweden the remnants of the distillation, together with the adjacent large limestone beds, can be utilized for the same purpose and the potassium present can be recovered as gas. A surplus of slag from steel mills, granulated, would supply the aggregates for very cheap slag-concrete building blocks or brick. (From *Tonindustrie-Zeitung*, March 17, 1921.)

Editorial Comment

Henry Ford's Railway

Ford's automobile plant has just done the biggest month's business in its history. We don't know of any other automobile plant equally prosperous, although we do know of a few pretty near bankruptcy. It will be recalled that Henry Ford was the man who started price-cutting in automobiles, and it is generally admitted that this action had more to do in hastening a readjustment in business generally than any other one factor. Although Mr. Ford has been called every name under the sun, almost anyone who will study what he has done will admit that he is a far-sighted, shrewd business man.

Mr. Ford is now the owner of the Detroit, Toledo and Ironton R. R. One of his first moves on assuming control was to reduce freight rates on sand, gravel and crushed stone 20 per cent. He wants to reduce these another 20 per cent, but the Interstate Commerce Commission is holding him up—he is going too fast to suit some other railway executives, and he is violating some rule of the commission.

Then Mr. Ford has proposed reducing all rates and a great howl is raised. Probably the objections to his action are well founded because it does disturb long existing rate relationships and gives the shippers who are fortunate enough to be on his line an unfair advantage over their competitors.

Yet Mr. Ford has never been accused of running his automobile plant for charity. He is generally credited with making a little money out of it. We suspect that he reduced rates on his railway for the same reason. He is not hide-bound by railway traditions; he has no railway experience, but nevertheless he may bring a fresh and invigorating *business-getting* element into the railway game that will indirectly have a wide influence.

Changes in the I. C. C.

President Harding (who comes from a limestone quarry country), it is fairly well known, has not been altogether satisfied with the status of the Interstate Commerce Commission since its handling of the coal situation a year ago. At that time it acquired a nation-wide distrust (possibly even disgust) on the part of shippers of nearly every material but coal and more particularly building material. And while since then the production of building materials has somewhat recovered, it is in spite of, rather than because of, any assistance from the commission.

These things have undoubtedly, directly or indirectly, brought about the sudden resignation of Chairman Clark and the appointment by President Harding of Frederick I. Cox, a New Jersey business man. It is also rumored that Commissioner Aitchison, so much beloved by the mineral aggregate industry, will go the way of Chairman Clark.

The trade papers affiliated with the railway interests bemoan the resignation of Chairman Clark. While in no way questioning the value of his long public service and his integrity, ROCK PRODUCTS would not truly reflect sentiment in the rock products industry if it did not see in his passing a certain feeling of relief and a hope for a better deal to these rather shabbily used producers of basic commodities. With his resignation the prospect of another open-top car embargo fades into insignificance.

The new chairman, while he may have no railway experience and possibly no predisposed sympathy for the poor railways, is obviously (from his photographs) a man of decision of character, and a man fully capable of drawing his own conclusions. More than that, few rock product producers would expect or ask. In the meantime they will be hoping the rumors about Mr. Aitchison may have some foundation.

Fresh Hope

The most important news of the week for sand and gravel shippers is contained in the following quotation from our Washington letter, says the weekly bulletin of the Indiana Sand and Gravel Producers Association, which quotes as follows:

The elements now dominant in the administration have reached the conclusion that, in view of the vast range of its new powers, the Interstate Commerce Commission cannot continue to be a *detached* body, after the manner of the Supreme Court, but must be vitalized and rejuvenated by being brought into closer contact with administration purposes and plans. It must be made responsive, in a measure, to public opinion or be deprived of its extraordinary authority. The resignation of Mr. Clark was not an incident, but the beginning of a new epoch. The administration is not reconciled to the backwardness of the commission in rectifying rate inequalities. It feels that proper consideration has not been given to an adjustment of heavy commodity freight rates to the selling price of the commodities, and that business revival has been unnecessarily held up by what is described as the too great conservatism on the part of the commission, which is governed too much by statistics and not enough by "practical considerations." A commission is required the policies of which can fit smoothly and quickly into general administration policy. Unless a commission can be got that will function in this way the Transportation Act must be revised so as to minimize the likelihood of the commission getting in the way of an administration economic program. The first result to flow from this situation will be a modification and reduction of freight rates and this will happen so soon as the proper setting has been arranged. The order should be ex parte, as was the case when rates were increased last summer.

Review of Eastern Markets

WITH CONTRACTS in the latter weeks of July totaling over $4,000,000 for construction work in the New England district, as compared with about $5,500,000 for the corresponding weeks of a year ago, it is evident that building operations are slowly but surely coming back to a point where larger calls for materials can be anticipated. Both manufacturers and dealers view the situation in this respect, and demands on the mills are growing noticeably more numerous. The outlook seems to hold definite encouragement.

The Boston building material market is without special feature. Dealers are stocked for all immediate demands and there is an air of expectancy that larger orders for fall construction are not far off. Prices show little or no change from the levels reported in the last issue of Rock Products.

The Boston cement market is exhibiting increased demand; during the past fortnight there has been a wider distribution of material and a number of sizable orders have been recorded. The material is priced at $3.90 a barrel, with established bag rebate of 10 cents. Cement in paper holds at $3.75 a barrel, delivered. Crushed stone has declined to $2.50 a ton, with some dealers still asking $3 for well-graded material in truckload quantities. Building sand is priced at $2.50 a cubic yard, while high grade white beach sand maintains at $4 a ton.

Lime prices are now well-established in the Boston market at the following figures: Common lime, 180-lb., net, barrel, $3.20; 280-lb. barrel, $4.50. Finishing lime, $3.40 and $4.75, for the two sizes of containers, in order noted; common hydrate lime, in paper, $20 a ton; finishing hydrate lime, in paper, $22.

Calcined plaster is selling for $5.40 a barrel of 250 lbs., while 320-lb. barrels are priced at $7.50. Sanded mortar plaster is quoted at $20 a ton, while fibre mortar material sells at $24. Gypsum tile, 3x12-in., is being retailed at 18 cents a foot, and 4-in. material at 20 cents.

Prices of important building materials at Providence, R. I., show no decline, but local dealers anticipate a recession in certain commodities in the near future. Portland cement holds at $4 a barrel at the different supply yards, four sacks to the barrel, with bag allowance of 7½ cents each. Barreled lime is priced at $3.25 and $4.50 a barrel, for 180-lb. and 280-lb. sizes, respectively. Common hydrate lime is selling for 70 cents a bag of 50 lbs., while finishing hydrate is quoted at 75 cents for the same size container. Tiger brand, finishing hydrate lime, is being retailed at 85 cents. Wall plaster, neat, in cloth, is being sold for $24 a ton, as is also wood fibre material.

New York

Construction work continues fairly active at New York and vicinity. Bronx and Brooklyn boroughs are leading in extent of operations, and sizable quantities of cement, gravel, lime and other basic materials are being absorbed for apartment and dwelling construction in these districts. Architects report a good volume of work ahead of this character, provided that price levels remain stable and labor goes forward without strikes or interruptions.

With regard to the latter there is no change in the situation. The men hold a contract from the employers for the present wage scale up to January 1, next, and the attempt of Building Trades Employers' Association to cut the scale at once by an amount of about $1 a day has met with decided opposition. The matter stands as a deadlock at the moment.

Building material dealers, for the most part, are encouraged by the present fair demand for supplies. During the past few weeks, due to the residential operations in different parts of the Greater City, the call has shown a sizable growth, while inquiries are far more numerous.

Prices of commodities show no change and the market is moving without special feature. There is a decided firmness in present levels, and it seems unlikely that there will be any further recession in quotations for weeks to come. Portland cement holds at $3 a barrel, with bag rebate of 10 cents. Common lime, in standard 300-lb. barrel, is priced at $4.50, while finishing material, in the same size container, is being retailed at $4.70. Common hydrate, in cloth bags, is selling for $22.50 a ton, while finishing hydrate carries a level of $24 a ton at the present time. Finishing plaster is $4.50 a barrel, in 250-lb. size, and $5.85 in 320-lb. barrel. Neat wall cement is being held at $22 a ton in cloth bags.

The crushed stone market carries a fair degree of activity at the present time, not quite what producers would like to see, but considerably better than experienced in weeks past. Gravel, 1½-in., is selling at $4.25 a cubic yard, delivered, with ¾-in. material holding at the same figure. Sand is quoted at $1.80 a cubic yard, on the job, while white sand is being held at a $5 level. Broken stone in standard 1½- and ¾-in. sizes, is selling at $4 a cubic yard.

The wholesale market is holding its own, with interest lagging in certain products, but well-maintained in others by the fair amount of orders received from local supply dealers. Gravel is selling for $2.25 a cubic yard in carload lots, and sand at $1.25. There are no fixed quotations at the moment on common hydrate lime, while finishing hydrate is being sold at the warehouse at about $16.50 a ton. Common lump lime, in 180-lb. standard barrel, is around $3.80, wholesale. Crushed stone is priced at $1.90 a cubic yard in carload lots.

Conditions in the Lehigh Valley

Production of cement continues at a good status in the Lehigh Valley cement district of Pennsylvania. Large demands are being made on the different mills for material for road operations, and the heavy bulk of distribution is going into this channel. The State of Pennsylvania is becoming a large user of cement for highway work, and a number of large mileage contracts have now been placed for concrete roads. New York and New Jersey, as well, in the Eastern districts, are going forward with sizable road programs, calling for large amounts of material.

Anticipated wage reductions at the mills have now come to pass; with the lowering quotations on cement, action of this sort has been impending for several weeks past. The lead has been taken by the Atlas Portland Cement Co., which has reduced the wage schedules at its Northampton mills about 8 per cent, effective August 1. Other companies are following along the same line, while the Giant Portland Cement Co., operating at Coplay, has announced a reduction of 5 cents an hour for various classes of labor. Men recently taken on at the company's Central mill have been notified of a probable lay-off, although both mills are now in operation.

Practically all of the larger companies are maintaining regular production at their mills in the Lehigh Valley district, with present idle plants being made ready for possible service. The Coplay Cement Co. has resumed operations at its Mill B, following a resumption of production at Mill S late in July. The entire plant of the company is now under active output.

The Emanuel Slag Co., Lower Catasauqua, Pa., has resumed production at its crushing plant after about a week's shutdown. During this time repairs were made to equipment. It is said that the crusher will now remain in continuous operation for an indefinite period.

Accident Prevention

The Design and Construction of Safeguards

By SIDNEY J. WILLIAMS
Secretary and Chief Engineer, National Safety Council

ACCIDENTS CAUSED BY WORKMEN being caught in machinery are usually more severe than where no machine is involved. Such accidents often result fatally or in the permanent disability of the workman. Practically all machine accidents can be prevented by properly-applied safeguards. Some foremen contend that guards curtail production. In the case of guards for the point of operation this is sometimes true, when the guards are first installed and the workmen are not accustomed to their use. In many instances, however, such guards have actually increased the production, in some cases almost doubling it.

Guards for belts, gears, and the driving mechanism of machines, if properly applied, will have no effect on the operation, or will actually increase the production by giving the workmen a greater sense of security. Much depends upon the installation of guards of proper design, suitable for the work at hand. The following general requirements or specifications for safeguards, if followed, will in a large measure solve the difficulties in guard construction.

1. A safeguard should be so designed and constructed that it will prevent *all* accidents on the part guarded—not only accidents to the operator while at his regular work, but also to the operator or passersby in case they slip or fall or carelessly touch the machine.

2. The guard should not interfere with production. If it does, it is liable to be taken off. In designing a guard it is generally wise to consult the man who will use it.

3. In general, the guard should be attached to the machine and not to the floor; if attached to the floor, use a connection which will interfere as little as possible.

4. The guarded part must be easily accessible for oiling, inspection, and repair. The door or removable section provided for this purpose should be hinged or otherwise attached to the remainder of the guard, or to the machine. If not, it is likely to be left off permanently.

5. The guard should not interfere with cleaning and sweeping around the machine. It should, therefore, be kept generally about six inches above the floor.

6. The guard should be strong enough to resist injury and keep its shape. A light, flimsy guard soon becomes bent and is discarded. A substantial guard is cheaper in the end.

7. Incombustible guards are preferred. Wooden guards, soaked with oil, may become a serious fire hazard. Metal guards are neater and wear much better. "Metal guards look as if you wanted to; wooden guards look as if you had to." Guards may be made of cast iron, sheet metal, wire mesh, expanded or perforated metal, or slats. Where subjected to acid or fumes, wooden guards may be necessary.

Tenth Annual Safety Congress
of the
National Safety Council
Boston, Mass.
September 26-30, 1921

From the standpoint of achievement the Annual Safety Congress of the National Safety Council ranks as one of the most important conventions held in America.

Several thousand men and women, actively engaged in preventing the useless sacrifice of human life from accidental causes, will attend this Congress.

One hundred and seventy-five speakers—men of national reputation—specialists representing every phase of safety and industrial betterment work, will address the various meetings. The experience of the past year will be reviewed, and a new and more intensive program developed for the coming year.

This is just one of the activities of the National Safety Council.

Experience teaches that a reduction of over 75 per cent can be made in accidents and accident costs. National Safety Council service can help you make this reduction.

NATIONAL SAFETY COUNCIL
Co-operative Non-Commercial
168 N. Michigan Ave., Chicago, Ill.

8. It is desirable to interlock the guard with the operating mechanism, where possible, so that the machine cannot be operated unless the guard is in place.

9. A safeguard can often be so designed that it will also serve to prevent wear on the parts guarded—for example, a solid gear enclosure.

As to the actual method of construction safeguards, the foreman is not so much concerned as this is the duty of the safety engineer or the master mechanic. He is concerned, however, in seeing that the guards provide adequate protection without unnecessarily interfering with machine operation, that they are substantially made, securely supported, and properly adjusted, with provisions such as doors or removable sections so that the machinery will be accessible for oiling, inspection, repairs, etc. That the foreman may know whether the machinery in his department is guarded in accordance with recognized safe practice, the important points in safeguarding power transmission apparatus and a few of the more common machines are given below.

TRANSMISSION

Gear Guards

All gears, wherever situated, should be guarded. Cast-iron guards are preferable because they may be made to fit more snugly, present a better appearance, and protect the gears from dust and injury. Guards for a variety of machines, and in many sizes, may be more cheaply made of sheet metal.

Gears should be completely encased; or, where this is impracticable, should have a band guard with side flanges extending inward beyond the root of the teeth. If there is a spoke hazard, the gear should be completely enclosed, or filled in between the spokes.

Belts and Pulleys

Horizontal belts, ropes, or chains, which come within seven feet of the floor or working level, or which must be approached while in motion, should be guarded on the sides and bottom. Overhead belts six inches or more in width and running 30 feet or more per second, more than seven feet above floor or working level, when located so that, should they break, they would endanger persons below, should be guarded underneath. All vertical and inclined belts (except belts one inch or less in width) should be guarded to a height of six feet from floor or working level. If the highest part of belt is less than six feet from the floor level, the guard may extend over the top of belt instead of being carried higher. The following requirements for guards are recommended by the National Safety Council:

Distance from Thing Guarded	Height of Guard	Maximum Size of Opening
0″ to 4″	6′ 0″	½″
4″ to 15″	6′ 0″	2″ square or 1″ between slats
15″ to 20″	3′ 6″	Standard railing. Preferably filled in

Shafting, couplings, clutches, collars, and set screws should have all dangerous projections removed, where practicable, and should be guarded if within seven feet of the floor or working level.

(To be continued)

New Machinery and Equipment

New Gearless Crusher

THE Kennedy-Van Saun Manufacturing and Engineering Corporation, 120 Broadway, New York City, after several years' experience with its gearless crusher for secondary crushing and fine grinding, have adapted it for use as a primary breaker.

In this crusher, the gears which heretofore have been essential parts of all gyratory crushers, are eliminated and the driving power is applied directly to the eccentric. The elimination of the gears permits higher crushing speeds without adding mechanical complications. In fact, a much greater degree of simplicity is possible, it is claimed. The gearless crusher is now made in sizes up to No. 60—the largest yet used in the quarry industry.

Some of the special features of the crusher are described by the manufacturer as follows: "The bottom plate sleeve acts as a support for the packed lower dust collar, and as this sleeve does not revolve, the wear on the collar is reduced to a minimum. This bottom plate sleeve acts also as a support in which the eccentric sleeve and ball are contained and for supporting the driving dogs. It also forms a journal for the driving pulley, which is equipped with ball bearings, reducing the friction. The bottom plate sleeve is shouldered on the inside to prevent the eccentric sleeve from moving upward. At the bottom it has a groove and shoulder for receiving the bayonet lock that supports the ball race and pulley.

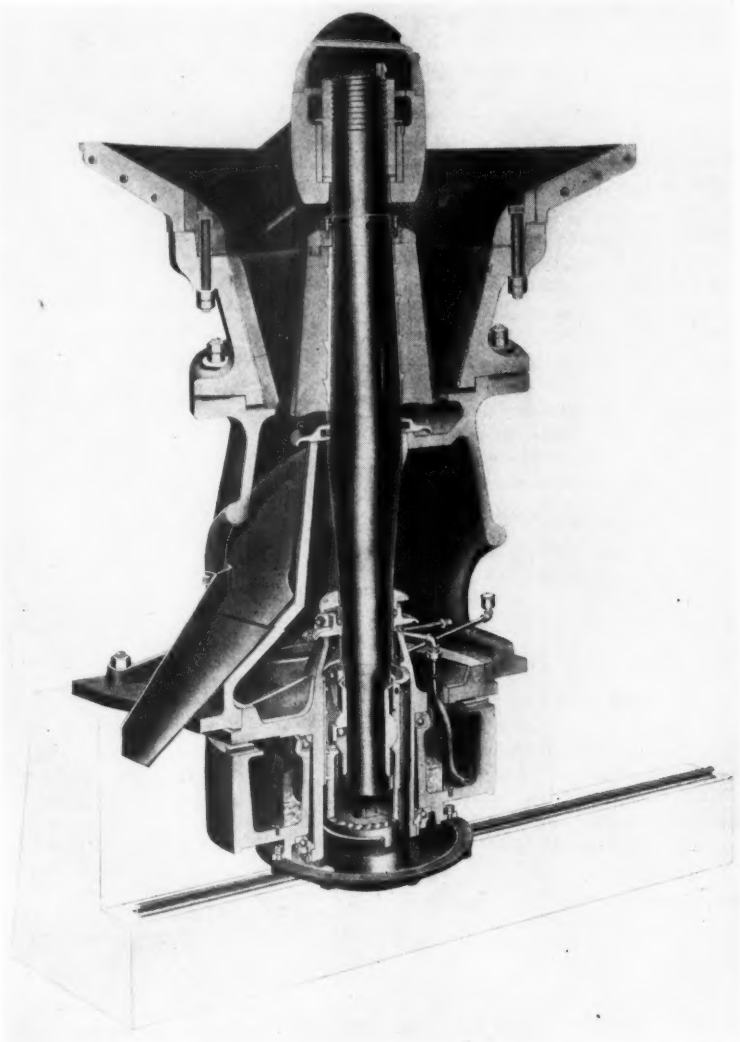
"The eccentric sleeve is made in two parts and is joined by bolts passing through at top and bottom. It has a pocket on the thick side for receiving the locking pin that connects the ball and socket bearing to the eccentric sleeve. This pin is flattened on the sides for providing ample bearing in the pocket, preventing wear. At the bottom, where the eccentric is joined together, it forms a male driving dog for fitting into the female seat.

"The driving power is applied through a universal device that eliminates all friction and side strain due to the driving of the eccentric and relieves that grinding and side-thrust common to all gyratory crushers. The thrust due to pressure against the eccentric is delivered to the eccentric sleeve at the middle of the ball, and thus the eccentric sleeve floats without pressure from top to bottom. One of these machines was run continuously for 36 hours at a speed of about 100 per cent beyond normal, on a test and at the end of this time the eccentric had barely reached blood temperature.

"The oiling system is unique. Oil from the eccentric chamber can flow freely between the balls, over the top of the pulley hub into the oil well inside the pulley. From this reservoir it is scooped up by centrifugal force and delivered to the top of the eccentric and ball and sleeve.

"An important improvement is made in the design of the bottom shell. The base is made square so that stone may be spouted in any direction. This enables the operator to set the machine in any position without having to predetermine whether it shall be right-hand, left-hand or standard, as has formerly been necessary. Thus, the crusher may be driven from a line shaft by belt or rope drive, universal rope sheaves or pulley for belt drives being supplied for leading belt or ropes from pulley or motor to the crusher. The drive pulley can be on the same horizontal plane or above or below the crusher, as desired."

The new gearless crushers have all the special features of the standard Kennedy gyratory, such as the ball-joint eccentric for maintaining the alignment of the main shaft and its bearing in the eccentric, the high-arched spider, spider ring,



New Kennedy gearless crusher made in large sizes

General Market News

Railways Lose Oklahoma Rate Case

THE OKLAHOMA CORPORATION COMMISSION was one of the first state railway-rate bodies to order a reduction of freight rates on sand, gravel and crushed stone.

In January the Corporation Commission ordered that freight rates on sand, gravel and crushed rock hauled not more than 10 miles should be 2 cents a hundred; not more than 20 miles, 2½ cents a hundred, and more than 20 miles and less than 30 miles, 3 cents a hundred. One cent additional was allowed for a two-line haul.

The railroads immediately appealed to the State Supreme Court, which has just decided that the rates ordered by the Corporation Commission should be effective, and also ordered the same rate to apply to sand, gravel and crushed rock used for any purpose, whether for road building or for building construction work. Pending a decision by the Supreme court, the former rate remained effective. It is 3 cents a hundred, regardless of whether the haul is 10 miles or 30 miles.

Now the railroads have demanded a rehearing by the Supreme Court, hoping it will reverse its decision. In case the rehearing is denied, then the railroads must immediately make a rebate in conformity to the Corporation Commission's rates, dating back to February 21, 1921, which would mean substantial sums.

Can't Discourage This Quarry Man!

SOME QUARRY MEN were pretty well disgusted a year ago when an open-top car embargo was on and freight rates were boosted sky high. An operator out in Arkansas has just been left in a far worse fix. His plant was on the Missouri and Northern Arkansas R. R., which, if you have read the papers carefully the last few days, you know discontinued operation on July 31.

John O. Willson, general manager of the Moss De Voy Lime and Stone Co., St. Joe, Ark., is the man. He has contracts for 300,000 tons of road stone, 10,000 bbls. of lime and any quantity of agricultural limestone, and his plant is stranded high and dry, cut off from all means of transportation.

Is he discouraged? He doesn't seem to be, for he writes the editor he has selected another quarry location on a regular railway, from which he can fill nearly all his contracts and sees a splendid future market. He needs capital to help him develop this new quarry and we hope he finds it.

Cement Company Stock on New York Stock Exchange

THE International Cement Co., with offices in New York City and plants at Hudson, N. Y.; Dallas, and Houston, Tex.; Cuba, Uruguay and Argentina, has applied to the New York Stock Exchange to list its 400,000 shares of capital stock. These shares have no par value.

This company recently acquired the Knickerbocker Portland Cement Co., Hudson, N. Y. The combined daily capacity of its six mills is over 12,000 bbls. If its application is accepted it will be the first portland cement company to have its shares listed by the New York Stock Exchange.

Ohio Rate Case Begun

SAND AND GRAVEL PRODUCERS in Ohio are working for a reduction in freight rates. A hearing before the State Public Utilities Commission was begun on August 2. A news item from Columbus states that George J. Bolender, chief witness for the State Highway Department, has said he will show that transportation costs are the big factor and the retail cost of road-building material only a secondary consideration in the high cost of road building.

The average price of sand in Ohio is 73 cents a ton and of gravel 78 cents, he said, while the average freight rate for either for the minimum distance of five miles is 89 cents.

Mr. Bolender demonstrated that if producers' cost of sand and gravel were cut in half, the difference in ultimate cost at point of delivery in many instances would be only 5 per cent.

As traffic manager for the Kalamazoo, Mich., Chamber of Commerce and executive secretary for the Michigan Sand and Gravel Producers' Association, Mr. Bolender was principal witness before the Michigan Public Utilities Commission's investigation of road material freight rates. That body cut rates 22½ per cent.

Stanley Krug, State Highway Department engineer, also testified as to excessive rates. C. J. Randall of the bureau of rates and service of the Utilities Commission, has been compiling data along the same line and was placed on the stand.

Mr. Bolender said the average haul for such materials in Ohio is 40 to 45 miles; while the average freight rate for a 40-mile haul in Ohio is $1.068, the maximum in Wisconsin is only 68 cents, northern Michigan 80 cents, Kentucky 80, Virginia 60 and Mississippi 60; in Indiana it is 84 cents and in Illinois from 70 to 84 cents.

Also railroads were asked to show why freight rates on road materials, not subject to fire hazard and other liabilities, should be higher, for instance, than on canned goods, bar iron, autos, lumber, paper, machinery, agricultural implements and the like.

The Public Utilities Commission itself instituted the hearing.

Kansas Cement Companies Indicted by State

IN ADDITION to federal indictments charged against them in the federal district court at New York, the cement manufacturers of the State of Kansas are now confronted with a new annoyance in the form of indictments by the grand jury of Reno County in that state.

The indictments charge that the defendant companies entered into an alleged unlawful combination which prevents free competition in the sale of cement and which tends to advance and control the price of cement to the consumers of Reno County.

The indicted companies are: The Ash Grove Lime and Portland Cement Co. of Kansas City, and Springfield; the Great-western Portland Cement Co. of Mildred; the Monarch Portland Cement Co. of Humbolt; the Lehigh Portland Cement Co. of Iola; the Fredonia Portland Cement Co. of Fredonia; the Bonner Springs Portland Cement Co. of Bonner Springs.

At the same time the above news comes newspaper dispatches also state that the Lehigh Portland Cement Co. has suspended the operation of its plant in Iola for a period of 30 days. The business depression is blamed, the company having accumulated 300,000 barrels of cement in its warehouses. It is without storage room for more and has not been moving its product as fast as it made it. Most of the men will be employed rebuilding the rock storage buildings and bins while the mill is idle. It is reported that the plant at Mildred is also about bin full. The Monarch Portland Cement Co. suspended the operation of its plant in Humboldt several weeks ago. The Chanute plant, owned by the Ash Grove Lime and Portland Cement Co., is running three kilns, maintaining operations on this basis for the sake of retaining its organization.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.35	1.35	1.25	1.25	.....
Buffalo, N. Y.			1.30 per net ton, all sizes			
Burlington, Vt.	1.00	.....	2.50	2.00	2.00	.....
Chaumont, N. Y.	1.75	1.75	1.75	1.50	1.50	1.50
Cobleskill, N. Y.	1.25	1.25	1.25	1.25	1.25	.....
Coldwater, N. Y.			1.50 per net ton, all sizes			
Eastern New York	.90	1.80	1.70	1.60	1.60	1.50
Eastern Penna.	1.00	.....	1.60	1.60	1.60	1.60
Munns, N. Y.	1.00	1.50	1.50	1.25	1.25	1.25
Walford, Pa.	1.40	1.60	1.75	1.75	1.60	1.60
Western New York	.70	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alden, Ia.	.80@1.00	.80@1.00	1.50	1.45	.....	.....
Alton, Ill.	2.00	.....	1.50	1.40	1.35	.....
Bettendorf, Ia.			All sizes, 2.00 cu. yd. f.o.b. quarry			
Brillion, Wis.	1.00	.....	1.20	1.00	1.00	.....
Buffalo, Iowa.	1.00	1.30	1.40	1.20	1.30	1.30
Chicago, Ill.	1.20	1.60	1.20	1.20	1.20	1.20
Columbia, Ill.	2.15	1.90	2.00	2.00	1.90	1.90
Dundas, Ont.	1.00	1.50	1.50	1.50	1.25	1.20
Eden and Knowles, Wis.	1.30	1.30	1.30	1.30	1.30	.....
Greencastle, Ind.	1.50	1.25	1.00@1.10	1.00@1.10	1.00@1.10	1.00@1.10
Illinois, Southern	1.75	1.60	1.60	1.50	1.60	.....
Kokomo, Ind.	1.10	1.25	1.25	1.10	1.10	1.10
Krause or Columbia, Ill.	1.60	1.30	1.30	1.30	1.30	1.30
Lannon, Wis.	.90	1.00	1.00	1.00	1.00	1.00
Marblehead and Brillion, Wis.	1.10	.....	1.20	1.10	1.10	.....
Montrose, Ia.	1.35	1.75	1.75@1.85	1.75	1.65@1.75	.....
Oshkosh, Wis.			1.40 per ton, all sizes			
River Roage, Mich.	1.25	1.40	1.40	1.40	1.40	1.40
Sheboygan, Wis.	1.05@1.10	1.05@1.10	1.05@1.10	1.05@1.10	1.05@1.10	1.05@1.10
Southern, Illinois	1.75	1.60	1.50	1.50	1.50	.....
Stolle, Ill. (I. C. R. R.)	1.75	1.60	1.60	1.50	1.50	1.50
Stone City, Iowa	.80	.....	1.40	1.35	1.30	.....
Toronto, Canada	1.90	2.40	2.40	2.40	2.15	2.10
Valmeyer, Ill.	1.60	1.30	1.30	1.30	1.30	1.30
SOUTHERN:			These prices include 90c freight			
Cartersville, Ga.	.....	1.85	1.60	1.60	1.60	.....
Chickamauga, Tenn.	1.10	1.10	.....	1.00	.85	.....
Chico, Texas	1.10	.....	1.25	1.25	1.25	1.10
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00	.....
Fort Springs, W. Va.	1.55	1.70	1.70	1.90	1.45	.....
Garnet and Tulsa, Okla.	.....	.....	1.60	1.60	1.45	.....
Ladds, Ga.	1.50	.....	.....	1.25	1.25	1.25
Portland, Ga.	.75	2.00	1.50	1.50	1.50	1.50
WESTERN:						
Atchison, Kans.	.50	2.10	2.10	2.10	2.10	2.10
			Other sizes 1.80 per ton			
Blue Springs and Wymore, Neb.	.20	1.65	1.60	1.50	1.40	1.30
Cape Girardeau, Mo.	1.50	.....	1.50	1.50	1.25	.....
Kansas City, Mo.	1.00	2.00	2.00	2.00	2.00	2.00

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Baltimore, Md.	1.25	2.50	2.35	2.25	2.00@2.25	2.00
Bernardsville, N. J.	2.00	2.20	2.00	1.80	1.50	.....
Branford, Conn.	.60	1.50	1.50	1.25	1.10	.....
Bound Brook, N. J.	2.00	2.30	2.00	1.70	1.60	.....
Dresser Jct., Wis.	1.00	2.45	2.45	2.30	2.00	.....
Duluth, Minn.	1.00	2.25	2.00	1.50	1.40	1.40
Dwight Station, Calif.			.75@1.00—all sizes			
E. Summit, N. J.	2.10	2.35	2.15	1.75	1.75	.....
Eastern Mass.	.60	1.95	1.75	1.50	1.50	1.50
Eastern New York	.90	1.80	1.70	1.60	1.60	1.50
Eastern Penna.	1.60	2.25	1.95	1.80	1.80	1.70
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	60@ .80	1.60@1.75	1.50	1.25	1.10	.....
Oakland, Calif.	1.75	1.75	1.50	1.50	1.50	1.50
Richmond, Calif.	.50*	.....	1.75*	1.50*	1.50*	.....
San Diego, Calif.	.50@ .70	1.45@1.75	1.40@1.70	1.30@1.60	1.25@1.55	1.25@1.55
Springfield, N. J.	2.00	2.40	2.10	1.80	1.75	1.75
Westfield, Mass.	.60	1.35	1.30	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Alexandria Bay, N. Y.	1.60	.....	1.30	1.50	1.20	.....
Berlin, Wis.	1.60	.....	1.40	1.50	1.30	.....
Columbia, S. C.—Granite	.75	.....	2.75	2.50	2.35	.....
Dell Rapids, S. D.	1.00	.....	2.10	2.10	2.10	.....
Dundas, Ont.—Flint	1.10	1.10	1.10	1.10	1.10	1.10
Eastern Penna.—Sandstone	1.10	2.00	2.00	1.70	1.70	1.70
Eastern Penna.—Quartzite	.90	1.80	1.55	1.30	1.30	1.10
Holton, Ga.—Granite	.40	.....	2.50	2.25	2.25	2.00
Lohrville, Wis.	1.60	.....	1.30	1.50	1.20	.....
Los Angeles, Cal.—Granite	.....	1.25@1.50	1.15@1.40	1.15@1.40	.....	.....
Macon, Ga.—Granite	.50	.....	2.50	2.25	2.00	2.00
Middlebrook, Mo.—Granite	3.50@4.00	.....	.....	2.00@2.25	.....	1.25@1.75
Red Granite, Wis.	1.60	.....	1.30	1.50	1.20	.....
Sioux Falls, S. D.	1.00	.....	2.00	2.10	2.00	.....
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	.....
Utley, Wis.	1.60	.....	1.30	1.50	1.20	.....

*Cubic yard. †Agrl. lime. ‖R. R ballast. §Flux ‡Rip-rap. a 3-inch and less.

Agricultural Limestone

EASTERN:

Chaumont, N. Y. — Analysis, 95% $CaCO_3$, 1.14% $MgCO_3$ — Thru 100 mesh; sacks, 4.50; bulk 2.75

Coldwater, N. Y.—Analysis, 56.77% $CaCO_3$, 41.74% $MgCO_3$, 70% thru 200 mesh, 95% thru 50 mesh, sacks 4.00; bulk 3.00

Grove City, Pa. — Analysis, 94.75% $CaCO_3$, 1.20% $MgCO_3$ — 70% thru 100 mesh; 80 lb. ppr., 5.50; bulk 4.50

Hillsville, Pa.—70% thru 100 mesh; sacks, 4.75; bulk 3.00

Jamesville, N. Y. — Analysis, 89.25% $CaCO_3$, 5.25% $MgCO_3$; sacks, 4.50; bulk 2.75

New Castle, Pa.—89% $CaCO_3$, 1.4% $MgCO_3$—75% thru 100 mesh, 84% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk 3.00

Texas, Md.—Analysis, 58.02% $CaCO_3$, 37.3% $MgCO_3$—50% thru 50 mesh; bags, 4.25; bulk 2.50

Walford, Pa. — 50% thru 100 mesh, 60% thru 50 mesh, 100% thru 10 mesh; sacks, 4.75; bulk 3.00

West Stockbridge, Mass., Danbury, Conn., North Pownal, Vt.—Analysis, 90% $CaCO_3$ — 90% thru 100 mesh; paper bags, 6.25—90% thru 50 mesh; paper bags, 5.25; bulk 3.25

Williamsport, Pa. — Analysis, 88-90% $CaCO_3$, 3-4% $MgCO_3$—50% thru 50 mesh; paper, 5.50; bulk 4.00

CENTRAL:

Alden, Ia.—Analysis, 99.16% $CaCO_3$ ..... .80

Alton, Ill. — Analysis, 96% $CaCO_3$, 0.3% $MgCO_3$—50% thru 4 mes. 4.50

Bedford, Ind. — Analysis, 98.5% $CaCO_3$, .5% $MgCO_3$—90% thru 10 mesh ..... 1.60@2.00

Belleville, Ont. — Analysis, 90.9% $CaCO_3$, 1.15% $MgCO_3$—45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk 2.50

Buffalo, Ia.—90% thru 4 mesh 1.00

Cape Girardeau, Mo.—Analysis, 90% $CaCO_3$, .044% $MgCO_3$ (90% thru 50 mesh, $2.00), 50% thru 4 mesh 1.50

Chicago, Ill.—Analysis, 53.63% $CaCO_3$, 37.51% $MgCO_3$—90% thru 4 mesh 1.50

Columbia, Ill., near East St. Louis—½-in. down ..... 1.25@1.80

Detroit, Mich.—Analysis, 88% $CaCO_3$, 7% $MgCO_3$—75% thru 200 mesh, 2.50@4.75—60% thru 100 mesh ..... 1.80@3.80

Elmhurst, Ill. — Analysis, 35.73% $CaCO_3$, 20.69% $MgCO_3$—50% thru 50 mesh 1.25

Greencastle, Ind. — Analysis, 98% $CaCO_3$—50% thru 50 mesh 2.00

Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$—90% thru 50 mesh 2.00

Marblehead, O.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$—52.4% thru 100 mesh, 59% thru 50 mesh, 100% thru 10 mesh; sacks, 5.25; bulk 3.00

Limestone screenings; bulk 1.50

McCook, Ill.—Analysis, 54.10% $CaCO_3$, 45.04% $MgCO_3$—100% thru ¼-in. sieve, 78.12% thru No. 10, 53.29% thru No. 20, 38.14% thru No. 30, 34.86% thru No. 50, 22% thru 100 ..... 1.50

Milltown, Ind. — Analysis, 93.10% $CaCO_3$, 3.2% $MgCO_3$ — 24% thru 200 mesh, 33.2% thru 100 mesh, 40% thru 50 mesh, 50% thru 40 mesh, 70% thru 20 mesh 1.65

Mitchell, Ind.—50% thru 100 mesh 2.00

Montrose, Ia.—⅛-in. 1.35

Ohio (different points), 20% thru 100 mesh; bulk ..... 1.50@1.75

Piqua, O. — Analysis, 82.8% $CaCO_3$, 8.2% $MgCO_3$; neutralizing power in terms of calcium carbonate, 95.3%—50% thru 100 mesh ..... 3.25@5.00

50% thru 50 mesh ..... 1.75@2.00

Ridgeville, Ind.—Analysis, 98% $CaCO_3$ 100% thru 4 mesh 1.75

River Rouge, Mich. — Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk ..... .80@1.40

Spring Valley, O. — Analysis 95.92% $CaCO_3$, 2.15% $MgCO_3$; 100% thru 10 mesh, bulk 3.00

Stolle, Ill., near East St. Louis on I. C. R. R. — Thru ¼-in. mesh — Analysis, 89.61% to 89.91% $CaCO_3$, 3.82% $MgCO_3$ 1.75

Stone City, Ia.—Analysis, 98% $CaCO_3$ —90% thru 50 mesh ..... .80

Toledo, Ohio—¼-in. to dust, 20% thru 100 mesh 1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page.)

Wilsehill, Ill. — Analysis, 97.12% $CaCO_3$, 2.50% $MgCO_3$ — 90% thru 100 mesh 5.00
50% thru 50 mesh..... 2.00

Yellow Springs, Ohio—Aanlysis 96.08% $CaCO_3$, 63% $MgCO_3$, 32% thru 100 mesh; 95.57%, sacked, 6.00; bulk.... 4.25

SOUTHERN:

Blowers, Fla.—Analysis, 98% combined carbonates—75% thru 200 mesh..... 4.75

Cartersville, Ga.—Analysis, 96% combined carbonates — pulverized limestone ..... 1.75@2.00

Claremont, Va. (Marlime) — Analysis, 50% $CaCO_3$, 2% $MgCO_3$—(90% thru 100 mesh, $4.00), 50% thru 100 mesh 3.50

Dittlinger, Tex. — Analysis, 99.09% $CaCO_3$, .04% $MgCO_3$—90% thru 100 mesh ..... 2.00@3.00
90% thru 4 mesh ..... 1.00@2.00

Grovania, Ga.—Analysis, 95% $CaCO_3$, no $MgCO_3$—50% thru 100 mesh..... 2.50

Hopkinsville, Ky. — Analysis, 94.6 to 98.1% $CaCO_3$; bulk 2.00

Knoxville, Tenn.—Pulverized 2.50
90% thru 100 mesh..... 2.00
90% thru 50 mesh..... 1.50

Ladds, Ga.—Pulverized limestone..... 2.50

Linnville Falls, N. C.—Analysis,, 53% $CaCO_3$; 42% $MgCO_3$—50% thru 100 mesh; sacks, 4.50; bulk..... 3.00

Mascot, Tenn.—Analysis 52% $CaCO_3$, 38% $MgCO_3$.
80% thru 100 mesh..... 3.00
All thru 10 mesh..... 2.50
80% thru 200 mesh..... 5.00
Paper bags, $1.50 extra per ton; burlap, $2.00 extra per ton.

Maxwell, Va. 2.50

Ocala, Fla. — Analysis, 98% $CaCO_3$—75% thru 200 mesh..... 4.50

WESTERN:

Colton, Calif.—Analysis, 95% $CaCO_3$, 1¼% $MgCO_3$—all to pass 14 mesh; bags, 6.50; bulk 5.50
Sacks, 15c extra, returnable.

Garnett, Okla.—Analysis, 86% $CaCO_3$, 50% thru 4 mesh ..... .50

Kansas City, Mo., Corrigan Sid'g—50% thru 100 mesh; bulk..... 2.00

Terminus, Calif. — Analysis, 96.2% $CaCO_3$, .04% $MgCO_3$—60% thru 200 mesh, 90% thru 100 mesh, 95% thru 50 mesh, 100% thru 4 mesh; sacks, 6.00; bulk 5.25

Tulsa, Okla.—90% thru 4 mesh..... .50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

GLASS SAND:

Baltimore, Md. ..... 2.25@2.75
Berkley Springs, W. Va..... 2.00@2.25
Cedarville and South Vineland, N. J..... 2.00
Cheshire, Mass. ..... 5.00@7.00
Hancock, Md.—Damp ..... 2.50@3.50
Klondike and Pacific, Mo..... 2.50@3.00
Mapleton, Pa.—Dry 2.50
Damp 2.00
Massillon, Ohio 3.00
Millington, Ill. 1.75
Mineral Ridge, Ohio 3.00
Montoursville, Pa.—Green, washed..... 1.50@2.00
Oregon, Ill.—Large contracts..... 1.75
Ottawa, Ill. ..... 1.25@2.25
Pittsburgh, Pa.—Dry, 4.00; damp..... 3.00
Rockwood, Mich. ..... 3.25@3.50
Round Top, Md.—Damp..... 2.00
St. Mary's, Pa.—Unwashed..... 2.40
Thayers, Pa. ..... 1.75@2.00
Utica, Ill. ..... 1.25@1.75
Zanesville, Ohio 2.50

FOUNDRY SAND:

Albany, N. Y.—Glass and sand blast.. 2.00@7.00
Core ..... 1.25@1.50
Furnace lining ..... 2.50@3.00
Molding fine, coarse and brass..... 2.00@2.75
Sand blast ..... 5.00@7.00
Allentown, Pa.—Core ..... 1.50@1.75
Molding coarse ..... 1.50@1.75
Arenzville, Ill.—Molding fine..... 1.40@1.60
Beach City, O. — Core, washed and screened ..... 2.00@2.50
Furnace lining ..... 2.50@3.00
Molding fine and coarse..... 2.25@2.50
Bowmantown, Pa.—Core ..... 1.35@1.50
Molding, coarse ..... 1.80@2.00
Cleveland, O.—Molding coarse..... 1.50@2.00
Brass molding ..... 1.50@2.00
Molding fine ..... 1.50@2.25
Core ..... 1.25@1.50
Columbus, O.—Core ..... .40@1.25
Sand blast ..... 3.50@4.50
Furnace Lining 2.00
Molding fine ..... 1.50@2.25
Molding coarse ..... 1.50@2.25
Stone sawing 1.50
Traction ..... .40@ .75
Brass molding 2.50
Conneaut, O.—Molding fine ..... 2.25@2.50
Molding coarse ..... 2.00@2.25

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.75	.75	.75	1.00	1.00	1.00
Buffalo, N. Y.	1.10	.95	.85	.85	.85	.85
East Hartford, Conn.			.75 per cu. yd.			
Erie, Pa.		1.00		1.15		1.75
Farmingdale, N. J.	.48	.48			1.40	
Hartford, Conn.	.90		1.25	1.15	1.15	1.15
Leeds Junction, Me.		.60@ .75	2.00	1.75	1.65	1.50
Ludlow, Mass.	.75*	.75*	1.70		1.50*	1.50*
Philadelphia, Pa.	.75	.75	1.25	1.25	1.40	1.40
Pittsburgh, Pa.		1.30	1.30	1.30	.85	.85
Portland, Maine		.50	1.75		1.35	1.35
Texas, Md.		1.00		Pure white sand, 1.50		
Washington, D. C.	.60@ .75	.60@ .75	2.00	1.40	1.20	1.10@1.20
CENTRAL:						
Alton, Ill.		.85				
Anson, Wis.	.50	.50		1.00		.90
Attica and Covington, Ind.	.90	.90	.90	1.00	1.00	1.00
Barton, Wis.		.60	.70	.70	.70	.70
Beloit, Wis.		.60	.60		.60	
Chicago, Ill.		1.75@2.23	1.75@2.43			
Cincinnati, Ohio	.70	.65	.90	.90	.90	.90
Columbus, O.	.90	.90@1.25	1.25	.90@1.25	.90@1.25	.90@1.25
Des Moines, Ia.	.90	.65	1.60	1.60	1.60	1.60
			25% gravel, .90; 50% gravel, 1.15			
Detroit, Mich.	.65	.65	.95	.95	.95	.95
Earlestead (Flint), Mich.	.70		60-40 sieves, .85; Pebbles, .95			
Eau Claire, Wis.	.50	.50	1.00@1.25	1.00	1.00	
Elgin, Ill.		.80	1.00	.80	.80	.80
Elkhart Lake, Wis.	.70	.58	.90	.90	.72	.72
Estill Springs, Ky.	1.15	1.15		1.00		.90
Grand Rapids, Mich.		.50		.83	.77	.77
Greenville, Mechanicsburg, O.	.80	.70	.80	1.00	.85	.80
Hawarden, Ia.		.70			1.60	
Indianapolis, Ind.	.60	.60		1.50	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Le Mars, and Doon, Ia.		.90		1.80		
Lincoln, Neb.		Sand .40, sand and gravel .80, drained for shipment				
Mason City, Ia.	.90	.80	1.90	1.80	1.70	1.65
Milwaukee, Wis.	1.15	1.15	1.25	1.25	1.25	1.25
Minneapolis, Minn.	.35@ .50	.35@ .50	1.50	1.50	1.50	1.25@1.50
Moline, Ill.	.70	.70	1.20	1.20	1.10	1.10
Oxford, Mich.	.35	.35		.85	.70	.70
Riton, Wis.		.40			.60	
St. Louis, Mo., f. o. b. cars....	1.60	1.65	1.80	1.60		1.55
Summit Grove, Clinton, Ind.....	.90	.90	.90	1.00	1.00	1.00
Terre Haute, Ind.	.75	.75	1.25	1.00	.85	.85
Winnipeg, Man.	1.90	1.90		3.25		2.85
Winona, Minn.	.60	.50	1.50	1.50	1.25	1.25
Yorkville, Moronts, Oregon and Sheridan, Ill.		.60@ .80	.70@ .80	.70@ .80	.70@ .80	.60@ .80
SOUTHERN:						
Alexandria, La.	.60@ .80					1.20@1.50
Birmingham, Ala.	1.48		all gravel—1.88			
Charleston, W. Va.			Sand 1.40—Gravel 1.50			
Estelle Springs, Tenn.	1.15	1.15	1.00	1.00	.90	.90
Ft. Worth, Tex.	2.00@2.25*	2.00@2.25*	2.75@3.00*	2.75@3.00*	2.75@3.00*	
Jedburg, Mo.		1.05	1.20	1.00	1.00	.95
Knoxville, Tenn.	1.15	1.15		2.15	1.95	1.75
Macon, Ga.		.75@1.00				
Memphis, Tenn.	1.12	1.12				1.95
N. Martinsville, W. Va.	1.30	1.30		1.40		1.00
New Orleans, La.	1.00		1.75		1.25	
Pine Bluff, Ark.	1.00@1.25	.80@1.05	Washed gravel, all sizes, 2.20			
Roseland, La.				1.25		
WESTERN:						
Grand Rapids, Wyo.	.50	.50	.85	.85	.80	.80
Kansas City, Mo.	(Kaw River sand, car lots, .75 per ton. Missouri River, .85)					
Niles, Calif.	1.00	1.00	1.40	.85@1.00	.85@1.00	.85@1.00
Pueblo, Colo.	1.25*	1.00*			1.50*	
San Diego, Calif.	.80@1.00	.80@1.00	1.30@1.60	1.25@1.55	1.15@1.45	1.10@1.40
San Francisco, Calif.		1.00	1.00@1.20	.85@1.00	.85@1.00	.85@1.00
Seattle, Wash.	1.50	1.50	2.00	1.50		1.50

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Grave. 2 inch and less
Attica, Covington, Silverwood, Ind., and Palestine, Ill.	.75	.75	.75	.75	.75	.75
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Cape Girardeau, Mo.			River sand, 1.00 per yd.			
Cherokee, Ia.			.80 per ton—1.20 washed			
Detroit, Mich.	1.10*					
Dudley, Ky. (Crushed Sand)..		1.05		1.00		
Elkhart Lake, Wis.			Washed gravel .66			
Estelle Springs, Tenn.						.90
Fishers, N. Y.	.65@ .85	.75@ .85				.65@ .85
Glenville, N. Y.				1.00*		
Hamilton, O.			6 in. and less, .20 per ton			
Hartford, Conn.		1.00*				
Hersey, Mich.				.60	.60	.60
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Janesville, Wis.			.65		.65@ .75	
Lindsay, Tex.						.60
Oxford, Mich.					.50	
Pine Bluff, Ark.			Road gravel .60			
Rochester, N. Y.	.60@ .75	.60@ .75			.50@ .65	.50@ .65
Roseland, La.		.75				
Saginaw, Mich., f. o. b. cars....		.75	1.30	1.30	1.30	1.30
St. Louis, Mo.			60% gravel, 40% sand 1.70			
Summit Grove, Ind.	.65	.65	.65	.65	.65	.65
Valde Rouge, La.						.85
Waco, Texas		.80		1.50		1.30
Winona, Minn.	.70					
Yardville, N. J.		.50@ .75				
York, Pa.		1.10@1.20		(crushed rock sand)		

*Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Buffalo, N. Y.	2.35	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	4.00	1.00	2.50	1.35	1.25	1.25	1.25
Eastern Pennsylvania and Northern New Jersey		1.20	1.50	1.20	1.20	1.20	1.20
Erie, Pa.	2.35	1.25	1.25	1.25	1.25	1.25	1.25
Emporium, Pa.		1.25	1.25	1.25	1.25	1.25	1.25
Lebanon, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Sharpsville and West Middlesex, Pa.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
Western Pennsylvania		1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Chicago, Ill.		All sizes, $1.50, F. O. B. Chicago					
Detroit, Mich.		All sizes, 1.65, F. O. B. Detroit					
Ironton, O.	2.40	other grades 1.75@2.00					
Jackson, O.	2.00	1.35	1.70	1.35	1.35	1.35	1.35
Steubenville, O.	2.00	1.40	1.70	1.40	1.40	1.40	1.40
Toledo, O.	2.20	1.70	1.95	1.95	1.95	1.70	1.70
Youngstown, Dover, Hubbard, Leetonia, Struthers, Steubenville, Lowellville & Canton, O.	2.00	1.30	1.70	1.30	1.30	1.30	1.30
SOUTHERN:							
Alabama City, Ala.	2.05	.80	1.00@1.25	1.15	1.05@1.10	.85@1.00	.85@ .90
Birmingham, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Ensley, Ala.	2.05	.80	1.00@1.25	1.15	1.05@1.10	.95@1.00	.85@ .90
Longdale, Goshen, Glen Wilton & Low Moor, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05

Agricultural Lime and Hydrate

	Agricultural Lime—Bulk	Agricultural Lime—Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Adams, Mass.		8.00	58 to 65	0.5 to 1.0	
Bellefonte, Pa.	8.50		98.2	.72	11.50
Branchton, Pa.		5.50			
Cassadaga, N. Y.—Marl		8.00@10.00	48.07	1.08	
Chippewa, Pa.	5.50		78.67	1.33	
Lime Ridge, Pa.	5.75		80.56-62.71	3.87-1.96	
Lime Ridge, Pa.	6.00@7.50		80.56-62.71	3.87-1.96	
Paxtang and Le Moyne	5.00		Bulk, run of kilns		
Rockland, Maine		8.00	65	1	
Rosendale, N. Y.	7.00		84	7	(bulk) 6.00
Union Bridge, Md.	11.00	5.50	73	1	13.00
Williamsport, Pa.	6.00	10.00	75	3	10.00
West Rutland, Vt.	4.50	7.50	68	3	
West Stockbridge, Mass.					15.00
Williams and Blue Bell, Pa.		8.25	57	33	11.25
York, Pa.	7.50		92	3	10.50
CENTRAL:					
Alton and Hannibal, Ill.	11.50		.95		
Delaware, Ohio			50	5-12	9.00
Knowles and Valders, Wis.	5.00	9.00	55	45	12.50
Mitchell, Ind.					12.50
Sheboygan, Wis.	5.50	8.50	58	40.5	
Woodville, Ohio			48	33	9.25
SOUTHERN:					
Burns, Tenn.	9.50		96	0.54	12.00
Claremont, Va. (Marl.)	5.00	7.00	85-95	2-5	
Erin, Tenn.	7.50		97.82	0.12	
Karo, Va.	8.50		97	1.25	
Knoxville, Tenn.	9.00		98.23		13.00
Staunton, Va.	7.50	8.75	70	10	
WESTERN:					
Colton, Calif.			97	2	15.00
Kirtland, N. Mex.	12.00				
San Francisco, Calif.			98-99	.5-.75	19.50
Tehachapi, Cal.	12.00@15.00	14.00@17.00	98	1.00	

Miscellaneous Sands

(Continued from preceding page)

Delaware, N. J.—Molding fine	2.00
Molding coarse	1.90
Brass Molding	2.15
Dresden, O.—Core	1.50
Molding fine and coarse	1.50
Brass molding	1.50
Dunbar, Pa.—Glass sand No. 2, damp	3.00
Traction, damp	2.75
Dundee and Chalfants, O.—Sand blast	3.00
Glass, core and traction	2.75
Molding fine and brass molding	2.25
Furnace lining	2.50
Molding coarse	2.00
Eau Claire, Wis.—Core	.75@1.25
Sand blast	3.00@4.25
Traction sand	.50
Franklin, Pa. and Utica, Pa.—Traction	2.50
Brass molding	2.25
Core	1.50@2.00
Molding fine	2.25
Molding coarse	2.00
Sand blast	5.00
Greenville, Ill.—Molding coarse	1.30@1.50
Howard, O.—Glass sand	3.00@3.25
Steel molding	2.25@2.50
Joplin, Mo.—Stone sawing and roofing	1.25
Kansas City, Mo.—Missouri River core	.80
Kasota, Minn.—Molding coarse and stone sawing	1.65
Klondike and Gray Summit, Mo.—Molding fine	2.00@2.50
Molding coarse	2.50@3.00
Mapleton, Pa.—Core, furnace lining, molding coarse and brass molding	2.00@2.75
Molding fine	2.25@2.75
Roofing sand	2.00@3.00
Sand blast	1.50@2.00
Massillon, O.—Glass sand, molding fine and coarse, core, and furnace lining	3.00
Traction	3.00
Michigan City, Ind.—Core, glass, traction and brass molding	.60
Millington, Ill. — Glass, core, furnace lining, roofing and stone sawing	1.75
Mineral Ridge, O. — Core, molding, sand blast, roofing, etc., washed, screened (damp)	2.25
Montoursville, Pa.—Core	1.25@1.50
Traction	1.00@1.25
Brass molding	1.50@1.75
New Lexington, O.—Molding fine	2.25
Molding coarse	2.00
Sand blast	3.00
Glass, core and traction	2.75
Furnace lining	2.50
Brass molding	2.25
Oregon, Ill.—Core and glass sand	2.00
Furnace lining	2.00
Molding fine and coarse	1.00
Sand blast	3.50
Stone sawing	2.00
Ottawa, Ill.—Crude silica sand	1.00@1.25
Core, molding, fine and coarse	1.00@2.25
Furnace lining	1.25@2.00
Roofing and traction	1.25@5.00
Sand blast	4.00@5.00
Stone sawing	1.50
Ottawa, Minn.—Core	1.00@1.50
Glass, molding coarse, roofing, stone sawing (all crude silica)	1.00@1.50
Ridgeway, Pa.—Glass sand, green	2.25
Glass sand, wash	2.50
Molding, fine and coarse	1.20

Miscellaneous Sands

(Continued)

Rockwood, Mich.—Core	2.75@3.00
Roofing	3.50
Sand blast	3.50@4.00
San Francisco, Cal.—Glass and roofing	3.00@3.50
Core, molding fine and brass	2.30@2.60
Furnace lining and molding coarse	3.60@4.25
Coarse core sand	3.60@4.25
Sand blast	2.30@3.60
Stone sawing and traction	2.30
Thayer, Pa.—Traction	1.75
Furnace lining	1.00
Molding fine and coarse	1.00
Core, green	1.50@1.75
Utica, Ill.—Core	1.10@1.25
Furnace lining	1.10
Molding fine	.85
Molding coarse	.85
Warwick, Ohio—Core, furnace lining, molding fine and coarse (dry)	2.50
Same, green	2.25
Williamstown Junction, N. J.—Glass sand	2.80@2.90
Core, wet	2.50@2.60
Zanesville, Ohio — Molding fine and Brass	1.50@1.75
Molding coarse	1.35@1.50
Furnace lining	2.50
Glass, core and traction	2.50
Sand blast	2.50
Steel molding	2.50
Pulverized silica thru 140 mesh	8.50
Thru 200 mesh	9.50

Talc

Prices given are per ton f. o. b. (in carload lots only) producing plant, or nearest shipping point.

Baltimore, Md.—Crude talc	4.00
Cubes	45.00
Blanks, per lb.	.09
Biltmore, N. C., ground talc—150-200 mesh, bulk	20.00@25.00
Pencils and steel workers' crayons, per gross	1.15@ 2.50
Chatsworth, Ga.—Crude talc	8.00@10.00
Ground talc (150-200 mesh), bags	12.50
Pencils and steel workers' crayons, per gross	1.50@ 2.00
Chester, Vt. — Ground talc (150-200 mesh), bags	8.00@10.50
Emeryville, N. Y.—150-200 mesh; bags	14.00
Glendale, Calif. — Ground talc (150-200-mesh	16.00@30.00
(Bags extra)	
Gouverneur, N. Y.—Crude talc	4.00
Ground Talc (50-300 mesh)	13.50@15.50
Hailsboro, N. Y.—Ground Talc (150-200 mesh)	15.00@20.00
Henry, Va.—Crude talc (lump mine run), per 2000-lb. ton	2.75@ 3.25
Ground talc (20-50 mesh), bags, 5.50@7.00; (200-350 mesh) bags	9.25@13.00
Johnson, Vt.—Ground talc (20-50 mesh), bulk	8.00
(Bags extra)	
Ground talc (150-200 mesh), bulk	8.50@15.00
(Bags extra)	
Keeler, Calif.—Ground talc (200 mesh), bags	16.62
(Bags extra)	
Los Angeles, Calif.—Crude talc	10.00
No. 1	10.00
Ground talc, No. 2	16.00
Silver Talc Dust, 600 mesh	5.00
Natural Bridge, N. Y.—Ground talc (150-200 mesh) bags	12.00@15.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk	8.50@10.00
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@22.00
(Bags extra)	
Vermont—Ground talc (20-50 mesh); bags	8.50
Ground talc (150-200 mesh); bags	9.00@16.00
Waterbury, Vt.—Ground talc (20-50 mesh), bulk	8.50
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@15.00
(Bags extra)	
Pencils and steel workers' crayons, per gross	1.20@ 2.00

Rock Phosphate

Raw Rock

Per 2240-lb. Ton

Centerville, Tenn—B.P.L. 72% to 75%	6.00@8.50
B.P.L. 65%	8.00
Gordonsburg, Tenn.—B.P.L. 68%	6.00@7.00
B.P.L. 70% to 75%	6.00@9.00
Mt. Pleasant, Tenn., analysis, 65-70% B.P.L.	6.00@7.50
Montpelier, Idaho—70% B.P.L.—Crude	5.00
Crushed 2-in. ring and dried	6.00
Paris, Idaho.—2,000 lb. mine run, B.P.L. 70%	4.00
Wales, Tenn.—B.P.L. 70%	7.75

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Gray Roofing Slate, f.o.b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$ 9.30	$8.40	$8.10	$8.10
24x14	9.30	8.40	8.10	8.10
22x12	10.72	8.70	8.77	9.10
22x11	10.72	8.70	8.77	9.10
20x12	10.72	8.70	8.77	9.10
20x10	11.70	9.60	9.42	9.42
18x10	11.70	9.60	9.42	9.42
18x 9	11.70	9.60	9.42	9.42
16x10	11.70	9.60	9.42	9.42
16x 9	11.70	9.60	9.42	9.42
16x 8	11.70	9.60	9.42	9.42
18x12	11.05	9.30	9.10	9.10
16x12	11.05	9.30	9.10	9.10
14x10	11.05	9.30	8.77	8.77
14x 8	11.05	9.30	8.77	8.77
14x7 to 12x6	10.40	9.00	8.45	.....
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$7.50	$7.50	$5.75
22x11	9.10	7.75	7.75	5.75
Other sizes	9.10	8.10	8.45	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

Granulated slate per net ton, f. o. b. quarries, Vermont and New York, 7.50.

(Continued from preceding page)

Ground Rock

	Per 2000-lb. Ton
Centerville, Tenn.—B.P.L. 70%—90% thru 100 mesh	9.00@10.00
B.P.L. 75% (brown rock)	12.00
Mt. Pleasant, Tenn — B.P.L. 68%—13% Phosphorus	7.50@9.00
14% Phosphorus	8.00
B.P.L. 65@70%	7.00@9.00
Norwills, Fla.—(Fla. Hard Rock)—B.P.L. 68%	10.00

Florida Soft Phosphate

Raw Land Pebble

	Per Ton
Bartow and Norwills, Fla.—B.P.L. 50%, bulk	6.00@ 8.00
B.P.L. 78%, bulk	13.50
Jacksonville (Fla.) District	10.00@12.00

Ground Land Pebble

	Per Ton
Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Morristown, Fla.—26% phos. acid	16.00
Lakeland, Fla.—B.P.L. 72%	13.50
B.P.L. 60%	6.00

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Bound Brook, N. J.—Trap rock, carload lots; bulk		2.30
Chicago, Ill.—Stucco chips, in sacks f.o.b quarries		17.50
Deerfield, Md. — Green; bulk	7.00	7.00
Easton, Pa.—Evergreen, creme green and royal green marble	10.00@15.00	10.00@15.00
Lincoln, Neb. — Red, white, grey, in bags		30.00
Middlebrook, Mo.—Red granite; sacks	30.00@35.00	20.00@25.00
Milwaukee, Wis.		21.00@30.00
Missouri river points — Different colors	20.00@25.00	20.00@25.00
Piqua, O.—Marble	8.00@10.00	8.00@10.00
Sioux Falls and Red Granite, Wis.	7.50	7.50
Tuckahoe, N. Y.—White marble	7.00@12.00	12.00
Crushed white stone and marble dust in 100 lb. bags	6.50@12.00	
Tate, Ga.—White limestone, sacks extra	5.00@ 7.00	5.00@ 7.00
Wausau, Wis.	14.00@18.00	
Wisconsin and S. Dak. points—Granite, different colors, bulk or sacks	1.50@ 2.00	3.00@ 7.00
Granite dust in bags	6.00	

Concrete Brick

Prices given per 1,000 brick, f. o. b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	18.00	30.00@45.00
Bellow Falls, Vt.	20.00	35.00
Birmingham, Ala.	16.00	27.50@50.00
Bridgeport, Conn.	31.00	32.00
Buffalo, Niagara Falls and Rochester, N. Y.	21.00	
Eau Claire, Wis.	20.00	30.00@40.00
Houston, Tex.		22.00
Lockport, N. Y.	17.00	
Milwaukee, Wis.	17.00@18.00	35.00@150.00
Omaha, Nebr.	26.00	33.00
Piqua, O.	18.00	25.00
Portland, Ore.	25.00	43.00@73.00
Fancy brick	100.00@150.00	
St. Paul, Minn.	15.00	32.00
Springfield, Ill.	18.00	20.00@25.00
Tonawanda, N. Y.	20.00	
Virden, Ill.	18.00	20.00@25.00
Winnipeg, Man., Can.	19.00	40.00

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	8.00
Barton, Wis. (Face $17.50)	10.50
Bloomfield, Ont.	16.00
Boston, Mass.	13.50@15.00
Brighton, N. Y.	15.00
Buffalo, N. Y.	16.50
El Paso, Texas	14.00
Gary, Ind.	11.50@12.00
Grand Rapids, Mich.	13.50
Lancaster, N. Y.	14.00
Michigan City, Ind.	11.00
Miller, Ind.	10.00@10.50
Milwaukee, Wis. (delivered at job)	14.50
Minneapolis, Minn.	13.00
Plant City, Fla.	10.00
Portage, Wis.—Common	15.00
Face	25.00
Redfield, Mass.	15.00
San Antonio, Texas—Common	16.00
Face	24.00
South Dayton, Ohio	14.50
Syracuse, N. Y. (delivered at job)	20.00
F. o. b. cars	18.00
Toronto, Can.	15.00
Washington, D. C.	14.50
Winnipeg, Can. (less $1 trade disc.)	16.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrate per Ton Finishing	Common
Atlanta, Ga.	19.00	16.00
Baltimore, Md.	22.25	17.50
Boston, Mass.	22.25	20.25
Cincinnati, Ohio	16.70	14.50
Chicago, Ill.	20.00	.....
Dallas, Tex.	27.50	25.00
Denver, Colo.	.....	16.00
Detroit, Mich.	22.00	19.00
Gypsum, O.	.....	13.40
Fort Dodge, Ia.	.....	15.15
Los Angeles, Calif.	.....	30.00
Minneapolis, Minn.	29.00	22.00
Montreal, Que.	28.00	.....
New Orleans, La.	.....	17.00
New York, N. Y.	16.49	15.00
Oakfield, N. Y.	.....	16.20
Plasterco, Va.	.....	19.30
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	24.40	22.00
Seattle, Wash.	27.00	.....

	Lump per 180-lb. Barrel (net) Finishing	Common
Atlanta, Ga.	1.60	1.50
Baltimore, Md.	(ton)	12.75
Boston, Mass.	3.50	3.25
Cincinnati, Ohio	(ton)	12.25
Chicago, Ill.	.....	1.75
Dallas, Tex.	.....	3.00
Denver, Colo.	3.00	.....
Detroit, Mich.	2.00	1.80
Los Angeles, Calif.	3.00*	3.00*
Minneapolis, Minn.	1.80	1.50
Montreal, Que.	15.00	(ton)
New Orleans, La.	2.75	2.00
New York, N. Y.	.....	3.79
St. Louis, Mo.	.....	2.50*
San Francisco, Calif.	.....	2.25*
Seattle, Wash.	3.50	.....

* 280-bbl. (net).

Portland Cement

Current prices per bar el in carload lots, f. o. b. cars, without bags.

Atlanta, Ga.	2.60
Baltimore, Md. (del.)	3.58
Birmingham, Ala	3.05
Boston, Mass.	2.86
Cedar Rapids, Ia.	2.51
Cincinnati, Ohio	2.57
Cleveland, Ohio	2.43
Chicago, Ill.	2.17
Dallas, Tex.	2.60
Davenport, Ia.	2.47
Denver, Colo.	3.10
Detroit, Mich.	2.43
Duluth, Minn.	2.10
Indianapolis, Ind.	2.43
Kansas City, Mo.	3.20
Los Angeles, Calif.	3.21
Milwaukee, Wis.	2.39
Minneapolis, Minn.	2.41
Montreal, Que.	2.75
New Orleans, La.	3.20
New York, N. Y.	260@2.70
St. Louis, Mo.	2.90
San Francisco, Calif.	3.09
Seattle, Wash.	3.10
Winnipeg, Man.	1.00

NOTE—Add 40c per bbl. for bags.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco* Calcined Gypsum	Cement‡ Sand Gauging Plaster	Wood Fiber	White§ Gauging	Sanded Plaster	Keene's Cement	Pottery Plaster	—Plaster Board— ¼x32x36" Weight 1500 lbs. Per M Sq. Ft.	—Plaster Board— ⅜x32x36" Weight 2000 lbs. Per M Sq. Ft.	Wallboard. ⅜x32 or 48", Lengths 6'-10', 2000 lbs. Per M Sq. Ft.
Akron, N. Y.	3.50	.....	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alabaster, Mich.	3.50	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Rapids, Kan.	3.50	4.50	7.50	9.00	11.00	11.50	11.00	.....	23.75	13.00	19.375	20.00	36.75
Castalia, Ohio	3.50	6.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Centerville, Iowa	3.50@4.20	4.50@7.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
†Eldorado, Okla.	.....	.....	.....	.....	11.00	11.50	.....	.....	15.50	.....	27.20	29.30	39.55
Fort Dodge, Ia.	3.50	4.50	7.50	9.00	11.00	11.50	16.45	.....	25.80	.....	19.375	20.00	30.00
Grand Rapids, Mich.	3.50	4.50	7.50	9.00	11.00	11.00	19.50	.....	27.25	.....	19.375	20.00	30.00
Gypsum, Ohio	3.50	4.50	7.50	9.00	11.00	11.00	20.25	8.00	27.95	22.25	19.375	20.00	30.00
Gypsumville, Man.	3.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hanover, Mont.	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Loveland, Colo.	3.50	4.50	7.50	9.00	11.00	11.50	.....	.....	29.80	.....	.....	.....	.....
Oakfield, N. Y.	3.50	4.50	7.50	9.00	11.00	11.00	21.20	7.50+	28.25	23.20	19.375	20.00	35.00
Piedmont, S. D.	.....	.....	7.50	9.00	11.00	11.50	.....	.....	32.25	.....	27.97	31.04	41.18
Plasterco, Va.	4.50	.....	7.00	9.00	11.00	11.00	21.90	.....	29.90	23.90	21.375	22.00	.....
Port Clinton, Ohio	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rapid City, S. D.	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
†Southard, Okla.	3.50	4.50	7.50	9.00	11.00	11.50	11.00	.....	15.50	13.00	26.20	28.70	39.40

NOTE—Returnable Jute Bags, 15c each, $3.00 per ton; Paper Bags, $1.00 per ton extra.
* Shipment in bulk 25c per ton less; †Acme, Tex., freight rates govern; ‡Bond Plaster $1.50 per ton additional; +Sanded Wood Fiber $2.50 per ton additional; §White Moulding 50c per ton additional.

News of the Industry

Incorporations

The Ohio Marl Co., Dayton, Ohio, has reduced its capital stock from $300,000 to $100,000.

The Texas Stone Products Co., Dallas, Texas, has increased its capital from $22,000 to $240,000.

The G. R. Bianchi Granite Co., Montpelier, Vt., has been incorporated for from $5,000 to $100,000 by C. R. Bianchi and Harry E. Bianchi.

The Victory Granite Co., Barre, Vt., has been incorporated for $30,000 by A. M. Cella, Mary Cella and Albert A. Sargent, all of Barre.

The Albany Asbestos Slate Co., Albany, N. Y., has been incorporated in Delaware for $200,000. C. B. Pace, Albany, N. Y., is the representative.

The Ohio C. Barber Lime Co., Baltimore, Md., has been incorporated for $600,000 by Clarence W. Perkins, Addison F. Hook and Mullin Wilson.

The National Humas and Chemical Co., Chassel, Mich., has been incorporated for $1,000,000. One of its propositions is to manufacture fertilizer from peat.

The Akka Cement Products Co., Dover, Del., has been incorporated for $120,000. It will produce and deal in concrete brick and other building materials.

The Mt. Piabia Stone Co., Elyria, Ohio, has been incorporated for $25,000 by L. B. Fauver, F. L. Hamel, A. H. West, Reno Mussey and A. B. Taylor.

The Carpenteria Clay Products Co., Carpenteria, Calif., has been incorporated for $150,000 to quarry rock and clay and manufacture their products.

The Philadelphia Sand and Gravel Co., Camden, N. J., has been incorporated for $100,000 by F. R. Hansell, I. C. Clow and John A. MacPeak, all of 419 Market St., Camden.

The Art Stone and Stucco Co., Bellefontaine, Ohio, has been incorporated for $10,000 by D. S. Moots, Stanton Smith, W. L. Smith, Murray Jones and Lewis F. Hale, of Bellefontaine.

The Granite City Lime and Cement Co., Granite City, Ill., which has been in the hands of a receiver for several months, was sold on July 30 to Louis Buenger, a farmer of that locality, for $77,525.

The Adamantex Co., Baltimore, Md., has been organized by George B. Clemmer of Baltimore and Everett M. Atlen of Washington, D. C., with a capitalization of $1,000,000 to manufacture concrete brick.

The Texas Rock Asphalt Co., Wilmington, Del., has been incorporated for $200,000. A permit to do business in Texas has been granted. R. J. Boyle is agent for the company at San Antonio, Texas.

The Monson Slate Products Co., Boston, Mass., has been incorporated for $250,000 by Wm. B. Esselen, president; Frederick R. Emmart, 380 Fairview St., Rosindale, treasurer, and Waldo D. Kettendorf, clerk.

The Randolph Sand and Gravel Products Co., St. Paul, Minn., has been incorporated for $100,000. The incorporators are J. P. Langford, Davenport, Iowa; S. R. MacNeal, Northfield; Emil Miller, Northfield, and J. A. A. Burnquist, St. Paul, Minn.

The Little Piney Sand & Gravel Co., lately incorporated in Rollo, Mo., has organized with the following officers: C. B. Denton, president; W. R. Bennett, vice-president and manager, and J. A. Clark, secretary and treasurer. Will develop 80-acre deposit on Little Piney River.

Gypsum

The United States Gypsum Co., according to a Lynchburg, Va., report, has unearthed at its mines in Scott County the remains of an enormous prehistoric animal with leg bones measuring over six feet and other measurements in proportion. The bones of other prehistoric animals have been found there, but this is the largest specimen yet uncovered.

Sand and Gravel

The Terry Lumber and Coal Co. is developing a gravel pit at Terry, Mont.

Oroville, Calif., reports that a group of former Richmond men have purchased 1000 acres of dredge rock land near Oroville and will establish a $300,000 rock crushing plant.

The Waupaca Sand and Gravel Co. plant at Lake Emily, near Fond du Lac, Wis., was completely destroyed by fire on July 26. The fire is believed to have started in the boiler plant.

The Builders' Sand and Gravel Co., Davenport, Iowa, is building three new gravel bins near Pershing Ave. at a cost of about $11,000. The new bins will care for approximately 750 cu. yd. of material.

The Texas Midland R. R., it is reported, will build a spur track four miles long from Alsdorf, Texas, to some new gravel property it has acquired. According to reports the railway will develop the deposit and sell road gravel.

The Mirabel Gravel Co., Mirabel, Calif., is developing a large gravel pit. A spur track of the Northwestern Pacific Ry. has already been constructed. The company is owned by J. N. Gregson and Leon Dearborn. Miss Augusta Gregson is in charge of the company's office.

The Stockton Sand and Gravel Co., Stockton, Kans., has made all the preliminary arrangements for starting its new plant. W. L. Edwards of Concordia is the manager of the company; J. C. Pasley, of Stockton, president, and Mr. Decker, of Concordia, is secretary and treasurer.

Cement

The Monarch Cement Co., Humboldt, Kans., resumed operation on August 4. Two kilns were fired up. A local newspaper states that the company was much encouraged with the volume of business in July.

The International Cement Co., New York City, has taken over the Knickerbocker Portland Cement Co. plant at Hudson, N. Y. O. E. Wasson, who for a number of years has been the superintendent, has retired, and T. Avnsoe, general superintendent of the International, is the acting manager at the plant for the present. Charles Andreas, formerly with the Gifford-Wood Co., and who has been with the International at its plant in Cuba, and more recently at New York office, on its engineering staff, is also in Hudson, and it is surmised that he will be located there permanently.

Silica Sand

The Standard Sanitary Manufacturing Co., whose home office is at Pittsburgh, Pa., has purchased through its Louisville, Ky., division, a 15-acre tract of land at Eastview, Hardin County, Ky., where there is an excellent deposit of silica sand. It is said the company will develop this deposit to supply moulding sand for its foundries at Louisville and elsewhere.

Sand-Lime Brick

The Bay State Brick and Stone Co., Haverhill, Mass., has purchased the sand-lime plant formerly owned and operated by the Worcester Brick Co., at West Auburn, Mass. The plant has been operated at various times by the Worcester Sand-Lime Brick Co., the Concrete Brick Co., and lastly by the Worcester Brick Co. It was put out of business by the foreclosure of a mortgage.

Quarries

The Consolidated Stone Mills, in the Bedford, Ind., limestone district, were destroyed by fire on July 13. The loss is estimated at $300,000.

The Pittsburgh Limestone Co., Pittsburgh, Pa., a large fluxstone producer, has added nine new leases to its quarry property in Shenango township.

The Arkansas Crushed Stone Co., Heber Springs, Ark., is prosecuting its former manager, W. M. Hall, on charges of embezzlement and passing worthless checks.

Atkins and Steabler, contractors for a highway known as the river road, below New Albany, Ky., are building and equipping a $20,000 crushed stone plant.

The Advance Industrial Supply Co., Ispeming, Mich., is operating a quarry at Pine Hill for the production of roofing granules and terrazzo chips. The stone is green in color.

The Ozark Quarry Co., Carthage, Mo., has closed its plant because the collapse of the $1,000,000 Masonic Temple under construction at Salina, Kans., cut off the principal demand for the stone.

Barren County, Kentucky, is said to contain a deposit of marble susceptible of a high polish and suitable for interior and monumental purposes. A report on this deposit has been made by the state geologist at Frankfort.

The Michigan Verde Antique Marble Co., Ispeming, Mich., is installing a new large jaw crusher at the quarry. This will make a 3-in. reduction of the stone, which is hauled to a mill at Diorite for reduction to roofing granules, terrazzo and pebble dash.

Cook County, Illinois, which includes the city of Chicago, produces almost half of the total output of limestone for the entire state, according to recent figures of the state bureau of mines. The output last year was about 2,500,000 tons, against 5,140,000 for the entire state.

The Colgan Limestone Products Co., Columbus, Ohio, is reported to be interested in the erection of an agricultural limestone grinding mill at Fultonham, near Zanesville, Ohio. It is said the plant will be electrically operated, will be fully equipped with modern machines to assure an excellent product. The daily output will be approximately 300 tons and will consist of the famous Putnam Hill limestone, recognized as one of the purest high calcium limestones in Ohio.

C. W. Squires, Galena, Kans., is contemplating converting the Eagle Mill near the Missouri, Kansas & Texas Ry. depot into a rock-crushing plant. All the rock, gravel and chat on the Southside Mining land has been contracted for and will eventually be converted in this mill into a commercial product to be used for railroad ballasting, road construction and cement. This crusher will furnish rock for ballast from one-half inch to two and a half inches. Besides being able to load 250 tons of crushed rock per day, Mr. Squires has it arranged so he can load 10 to 15 carloads of gravel and sand each day.

The Shelby County Farmers Co-operative Limestone Development Association, Shelbyville, Mo., has been incorporated by a group of farmers for $10,000. The plan of the promoters is to make the company strictly co-operative. The capital stock will pay a fixed dividend and the balance of the profits after setting aside a safe reserve will be divided among the stockholders on the basis of patronage. The association will execute the contracts for pulverized limestone made by local farmers with Messrs. Boucher and Broyles of Hannibal. These contracts aggregate 3500 tons. It is proposed to purchase a combined crusher and pulverizer with a capacity of around 100 tons per day, and to lease oil power to operate same. Mining tools for quarrying the rock will also be leased or purchased. The equipment will include several end gate lime spreaders which will follow the pulverizer from quarry to quarry. This arrangement will permit patrons to have their ground limestone loaded directly in their wagons without shoveling and to have it spread without purchasing a spreader. D. J. Boucher, superintendent of mines and railroads for the Atlas Portland Cement Co., attended the meeting of the acting directors at Shelbina Saturday and gave technical information in regard to mining the rock, crushing and grinding.

Rock Products

The Only Journal With a Paid Circulation in the Rock Products Industry

BUYERS' BULLETIN

MANUFACTURERS OF MACHINERY AND EQUIPMENT:—These inquiries are live, up-to-date inquiries that have come direct to us from the individual in each case.

READERS OF "ROCK PRODUCTS":—This Department is for your special help and service. If you do not see what you require advertised in "Rock Products," tell us your needs and we will publish them here. There is no charge for this service.

Standard Lime & Stone Co., Lock Box 164, Fond du Lac, Wis., write—"Where can we buy paper barrel liners for lime barrels, preferably the corrugated heavy brown paper lining for barrels with 16-inch heads and 28-inch length?"

Novella Cement Co., Guatemala City, Central America, want catalogs and data on the following equipment: bagging machines, conveyor belting, brick machinery, cableways, chain hoists, crushers, dust collecting systems, lime hydrators, electric welding equipment, winches and wire cloth.

Centerville Gypsum Co., Centerville, Iowa, want catalogs on air separators or classifiers.

M. B. Updike, Box 1266, Memphis, Tenn., write us as follows: "I am informed that you might be able to tell me where we can obtain a rotary cement kiln or a smelter to handle ferro manganese. We are in the market for either. We are looking for machinery for conversion of rock into the above products and allied raw materials. The names of any manufacturers of this class of machinery will be appreciated."

Allied Engineering Co., All Nations Bank Bldg., Pittsburgh, Pa., want prices and data on machinery for complete sand and gravel plant of 1000 ton capacity per 10 hour day.

George W. Shores, 68 Wentworth Ave., Milwaukee, Wis., wants catalogs on the following equipment: air compressors, crushers, steam shovels, rock drills, pulverizers, lime kilns, sand and stone dryers and blast hole drills.

David MacKenzie, Limehills P. O., Southland, New Zealand, desires catalogs on the following: wrenches, bags, sheaves, welding equipment, centrifugal pumps, motors, hoists, forges and wagon loaders.

L. D. Lewis, 307 Securities Bldg., Seattle, Wash., is interested in the development of a rock phosphate deposit.

Hoosier Lime Co., P. O. Box 492, Salem, Ind., want catalogs and prices on quarry cars, 2 way side dump, all steel, 36 and 40 gauge, 1½ and 2-yard capacity.

Classified Advertising

Rates for advertising in the Classified Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Help Wanted

WANTED

A competent superintendent taking charge of plaster board plant. Must have experience and satisfactory references. Address

Box 1496 **Care of Rock Products**

Attention Manufacturers

Concrete hardened in less than two hours by the "Smith" process. Manufacturers of cement products can reduce their curing time and increase their output by using our system. It will pay you to investigate. Do not write unless you mean business. Address

"CONCRETE," Care Rock Products

Immediate Delivery

6, 7½, 9, 10 and 18 K Crushers

18K GATES ANGLE DRIVE (BARGAIN).
2—150-Hp. 125-lb. Marine type boiler, and others.
No. 10 McCULLY—BARGAIN, $6750.00.
4 No. 6 Gates (Mang. Fit) nickel steel shafts.
50- and 75-Hp. S. D. hoists, 25 Cy. Mtr. Drive.
4000 ft. ROEBLING TRACTION CABLE, ⅝-in.
Air Compressors (steam-belt), 50 to 4000 ft.
5, 6 and 12 ton, 24-in. gauge gasoline loco's.
1—8x8 and 10x10 Air Comp. (belt).
2—180-ft. Quick Shift, 30-ft. bucket towers.
6-in., 8-in. and 10-in. SAND PUMPS.
25—40-Hp. Thomas D. D. Elec. Hoist, A.C., 60 Cy.
5, 10, 15 ton Holt Tract. Prac. NEW.
1—9K GATES REG. DRIVE (BARGAIN).
Send us your inquiries—Sand Pumps, Motors, Contractors' Equip., etc.

ROSS POWER EQUIP. CO.
Indianapolis, Ind.

WANTED

1—2½-yard Steam Shovel Dipper for 70-ton Bucyrus Shovel.

L. D. Smith Stone Company
Sturgeon Bay, Wis.

NO. 8-D, GATES GYRATORY CRUSHER

STANDARD DRIVE

Fitted with manganese head and concaves. Included with this crusher, we have the following extra spare parts:

1 New, Manganese head.
1 New, set of manganese concaves.
1 New, main shaft.
1 New, Spider, and 2 New, eccentrics.

We also have many other sizes and types. We specialize in good quarry equipment of all classes. Write us fully.

Reading Engineering Co., Inc.
1227 Tribune Bldg., New York, N. Y.

Used Equipment

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Machinery For Sale

DRYERS—Direct-heat rotary dryers, 3x25', 3½ x25', 4x30', 5½x50' 6x50' and 7x60'; double shell dryers, 4x20', 5x30' and 6x35'; steam-heated air rotary dryers, 4x30' and 6x30'.

KILNS—Rotary kilns, 3½x25', 5x60' and 6x70', 6x100', 7x80' and 8x110'.

MILLS—6x8', 6x5', 2½x3" 3x3½' pebble and ball mills; 8x4', 6x4' and 4x4' continuous ball mills; 3' March mill; 42", 33" and 24" Fuller-Lehigh mills; 4½x20', 5x11', 5x20', 5½x22' and 6x20' tube mills; 7½x13", 9x15", 16x10" and 30x60" jaw crushers; one "Infant" No. 00, No. 0, No. 2, No. 3, and No. 9 Williams' swing hammer mills; one Kent type "G" mill; 36" and 40" cage mills; 3' and 4½' Hardinge mills; 18x12", 20x12" and 30x10" roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; 3 roll and No. 000, No. 00 and No. 0 Raymond mills; one No. 5 Telsmith breaker; one 36" Sturtevant emery mill; one 3 roll Griffin mill; 60" chaser mill.

SPECIALS—Five automatic package weighing machines; jigs; one keystone excavator; 6x8', 6x5' and 4x3' Newaygo vibrating screens, Richardson automatic scales.

Air compressors and tanks.

W. P. Heineken, Engineer

95 Liberty Street, New York. Tel. Cortland 1841

"Everything for the Quarry"

3-ton Plymouth 4'x8½" gauge Gasoline Locomotive.
10x16 cyl. 36-in. gauge Porter Saddle Tank.
9x14 cyl. 36-in. gauge Vulcan Saddle Tank.
7x12 cyl. 36-in. gauge Davenport Saddle Tank.
⅝-yd. Thew "O" Traction Shovel.
10—24-in. gauge 1½-yd. Western Dump Cars.
6—3-yd. Koppel 36-in. gauge Dump Cars.
15—36-in. gauge 4-yd. Western Dump Cars.
3—16-yd Western Air Dump Cars.
33-in. R. H. Lehigh Fuller Mills.
7x10 and 8x10 D.C. D.D. Hoisting Engines.

Rails, Track Material, Steam Shovels, Tanks

ZELNICKER IN ST. LOUIS

Send for bargain list—Bulletin 290

Derricks—Hoisting Engines

For derricks, hoisting engines and material handling equipment, write us and save money. We have in stock derricks 8"x8" three tons to 20"x20" thirty tons capacity. Also 70 hoisting engines and car pullers, one, two and three drums, friction drums, reversible, handle 5000 pounds on single line. Pumps, rock drills, crushers, cars, cable, rope, blocks, etc. $500,000 stock.

Wilson Machinery Company

331 West 35th St., Chicago

FOR SALE

One 40 ft. bucket Illinois Elevator with 9 ft. by 2½ ft. screen; like new; run only three weeks.
One Albrecht Excavator.
One 3 ton F. W. D. truck, with side dump body. All in good running condition.

WM. F. GUETSCHOW

R. R. 1, Box 1B BELOIT, WIS.

20—3-yard, side dump, 36" gauge Oliver Tram cars.
14—1½-yard, side dump, 36" gauge all steel tram cars.
12—1-yard, side dump, 36" gauge all steel tram cars.
1—Sparta Number 30 oil or well drill rig complete.
2—48" diam. by 24' long American Process dryers.

Address

E. W. COOPER, ENGINEER

174 3rd Ave., No. Nashville, Tenn.

SEVERAL BELT BARGAINS

98 ft. 24" 4-ply Rubber-Covered Conveyor Belting, slightly used.....$1.50 per foot
100 ft. 30" 8-ply Canvas-Stitched Belting, slightly used.....$1.62 per foot

NATIONAL BELTING AND SALVAGE CO.

268 East Water St., Milwaukee, Wisconsin

CRUSHERS FOR SALE

2 Traylor Jaw—15"x24" and 10"x16".
2 Traylor Rolls—42"x14" and 32"x10".
1 50-ft. Bucket Elevator, 18"x10" buckets.
2 lo Belt Conveyors, about 75 ft.
Other grinding and drying machinery.

Send for List

HULBERT A. BOND

ROWAYTON CONNECTICUT

Crushing Plant $6000

1—No. 5 Gates Style D, regular drive.
2—No. 6 Gates Style D, regular drive.
1—No. 6 Gates Style D, left hand drive.
1—Revolving Screen, 48"x22'.
1—72x18 Horizontal return tubular boiler, butt strapped, 115 lbs.
1—14x24 Horizontal steam engine.
1—Pump. 1—Feed water heater, shafting pulleys, belting and 2 overhead hoists. Will separate.

Other plants for sale. Also 15 40" gage end dump cars.

FRANCIS E. B. O'BRIEN

41 S. 15th St. Philadelphia, Pa.

Wanted—Used Machinery

1—61 Marion Steam Shovel.
1—40 ton Standard Gage Saddleback Locomotive.

Machinery must be in good condition and guaranteed. State terms and price.

The Texas Stone Products Co.

DALLAS, TEXAS

WANTED

Large Jaw Crusher

60 in. x 48 in., 42 in. x 40 in. or 36 in. x 48 in. Advise price, description, weight, freight rate, whether Manganese fitted and previous use.

Neverson Granite Company

Simms, N. C.

WANTED

GATES No. 5-K or No. 6-K suspended shaft, Manganese fitted—Right angle drive.

FREDERICK D. LINCOLN

50 Church St. New York

Locomotives for Rent and Sale

2—32-ton Vulcan four-driver saddle-tank, used sixty days, built March, 1921.
1—40-ton 17x24" four-wheel switcher.
2—50-ton 18x24" six-wheel switchers.
2—NEW 25-ton six-wheel Porters, separate tenders, 36" gauge.
2—18, 14, and 10-ton Vulcans, 36" gauge.

MISCELLANEOUS

13—6-yd. rebuilt dump cars, std. gauge.
20—12-yd. Westerns, like new, std. gauge.
50—60,000-lb. capacity flat and box cars.
1—Western standard gauge spreader.
1—Osgood 18 revolving shovel, traction wheels, No. 794.
1—Marion 36 steam shovel on traction wheels.
1—Marion 76 steam shovel, No. 3503, std. gauge.

2-in., 4-in., and 6-in. simple, duplex, and centrifugal pumps, new 3-drum hoists, road rollers, and tripod drills.

Locomotive-Cranes, Railway Equipment, etc.

INDUSTRIAL EQUIPMENT CO.

McCormick Building, Chicago, Ill.

A FEW PRIZE BARGAINS

JAW CRUSHER PLANT, WITH POWER

Complete Plant—Acme 11x22 Jaw Crusher on Trucks, 28' Elevator Bucket Outfit, 5 section, 16'x30" Rotary Screen, 50-ton, 6-pocket Acme portable Bin on wheels. 35 Hp. Port Huron Steam Traction Engine & Boiler, Steam Pump, Belting, Fittings, etc.

LOCOMOTIVES

Std. Gauge

100-ton Amer. 10-wheel & Tender, 175 lbs.
50-ton Baldwin 6-wheel Switcher & Tender, 150 lbs.
42-ton Porter 4-wheel Saddletank, 150 lbs.
20-ton Manhattan Forney type.
Also 36" gauge 10x16 and 9x14 Porter Saddletanks.

GYRATORY CRUSHER

McCully No. 5 Gyratory, Manganese Concaves.

AIR COMPRESSORS

625 & 400 ft. Bury Compressors, Belted Type.
250 ft. Quincy; Gas Eng. Driven, portable on wheels.
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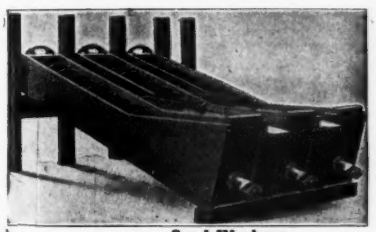

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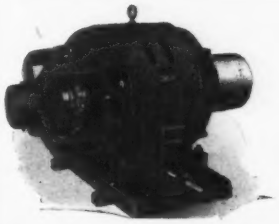

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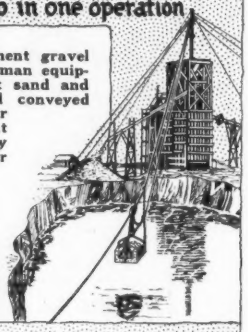

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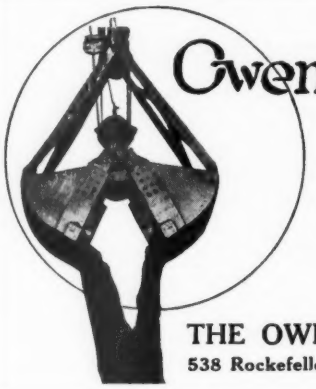

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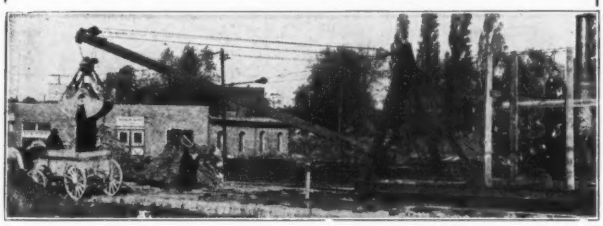

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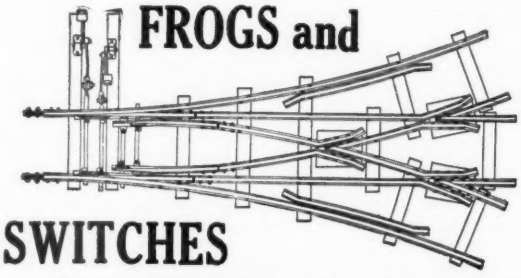

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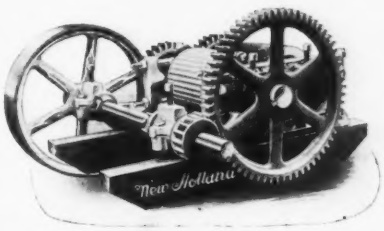

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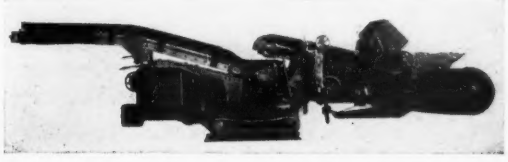

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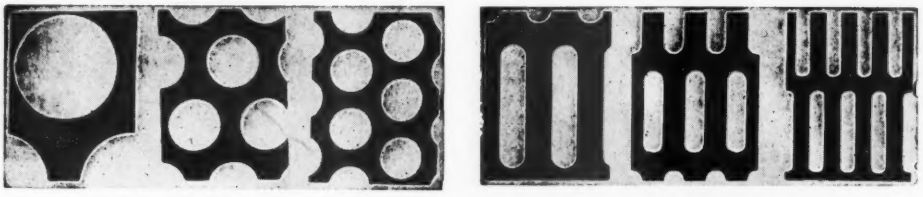

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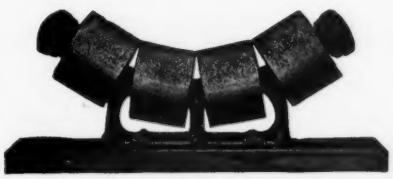

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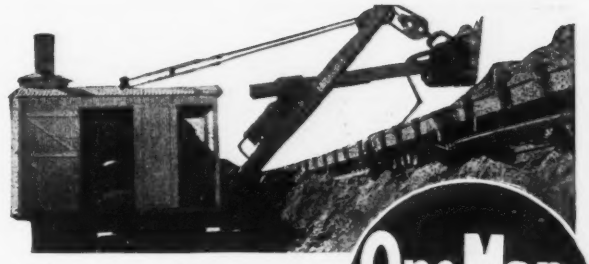

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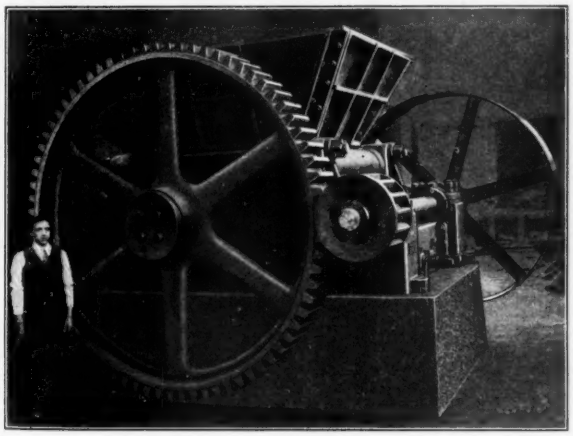

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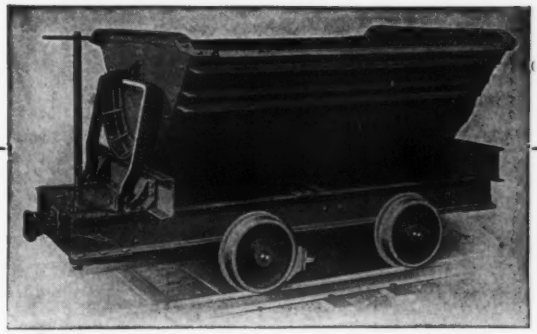

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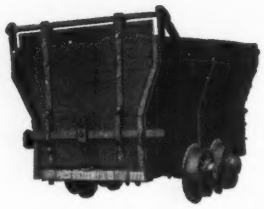

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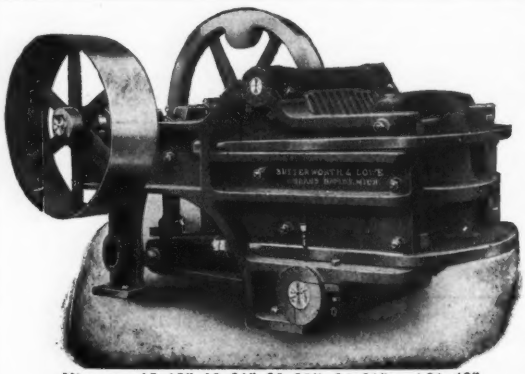

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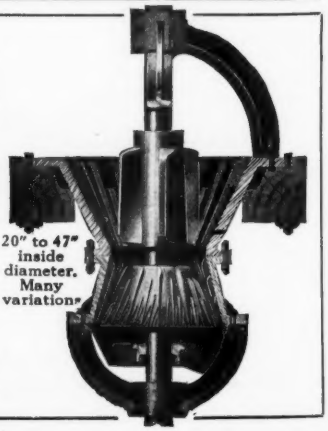

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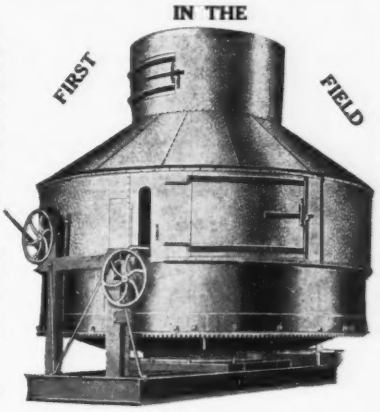

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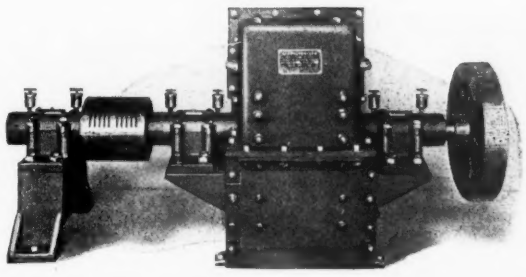

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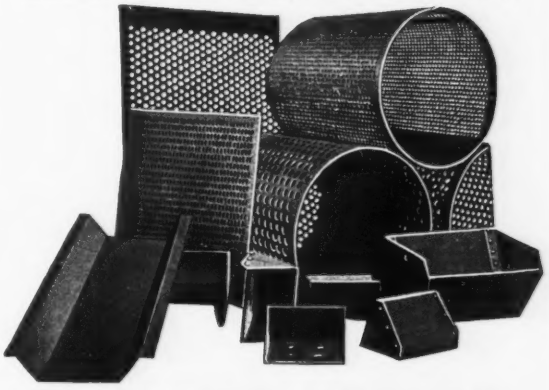

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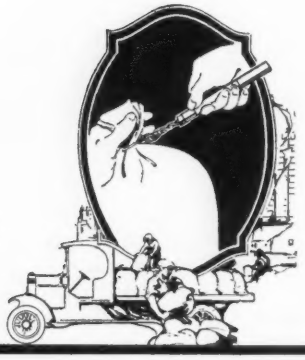

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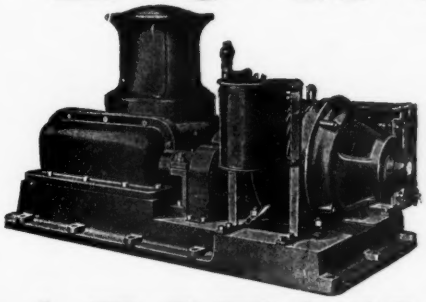

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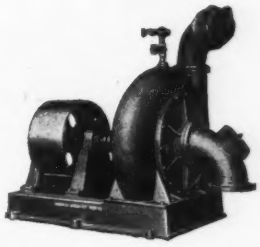


Standard Belt Sand Pump

This type of pump is the result of 57 years' experience building dredging pumps. It is a heavy, durable pump for average service.

Built in sizes 4" and up.

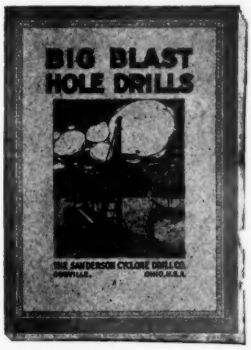
Morris Machine Works
Baldwinsville, N. Y.

39 Cortlandt Street, New York City
Real Estate Trust Bldg., Philadelphia, Pa.
217 N. Jefferson St., Chicago, Ill.

Bulletin No. 19-B fully describes our complete line of sand and dredging pumps. Have you your copy?

Morris

Since the Civil War Builders of Centrifugal Pumps, Hydraulic Dredges, and Steam Engines



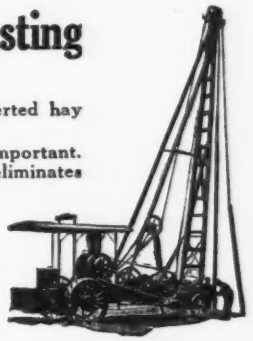
Analyze Your Drilling and Blasting

Our new Blast Hole Catalog B-46 (96 pages) will help you.

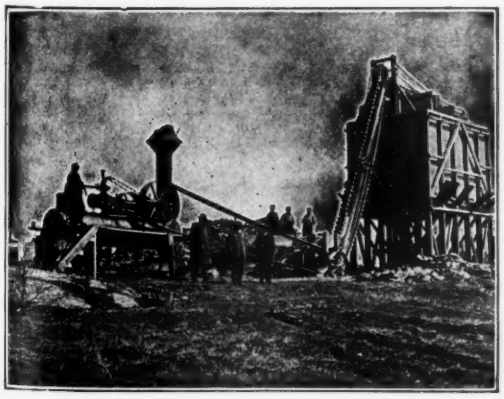
The day of poking a hole down with a rivet header or a converted hay bailer is past.

Drilling, being the first step in stone production, is the most important. One cent or one-half cent per ton cost saved in this operation often eliminates competition.

With Cyclone No. 14 Drills on the job and Cyclone Service in reserve, your drilling and blasting troubles fade—and your costs will be right.



THE SANDERSON-CYCLONE DRILL CO.
Orrville, Ohio
Eastern and Export Office, 30 Church St., New York



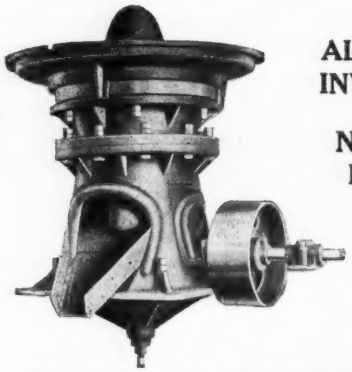
COMPLETE INSTALLATIONS
For Stone Quarries or Lime Plants

We are prepared to build and superintend the installation of all equipment necessary to start operations.

Reliance Products are equal to the best and we know that our engineers can save you money by their recommendations. Prompt deliveries.

Let Us Quote You Prices

Universal Road Machinery Co.
Kingston, N. Y.
Reliance Quarry and Road Building Equipment



ALWAYS AN INVESTMENT

NEVER AN EXPENSE

AUSTIN
GYRATORY CRUSHERS

are always on the job, year in and year out, doing their work efficiently and economically.

Their purchase is a real investment—one that pays big dividends in service and satisfaction and in money as well.

Made in stationary and portable types and in eight sizes having hourly capacities of from 5 to 500 tons.

Catalog 28-T is yours for the asking

Austin Manufacturing Co.

New York CHICAGO San Francisco

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Mussens Limited, Montreal, Toronto, Vancouver;
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EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

LOCOMOTIVE CRANES
CLAM SHELL BUCKETS - SHIPBUILDING CRANES
CAR DUMPERS PILE DRIVERS
THE McMYLER INTERSTATE CO.
CLEVELAND OHIO

Handling Limestone With a Type "J" Locomotive Crane

This crane has proven to the satisfaction of a large number of owners that the heavier crane is the cheapest one to buy for some classes of service.

The Type "J" is only one of a large number of cranes manufactured by this Company.

We also manufacture a complete line of clamshell buckets.

The McMyler Interstate Co., Cleveland, O.

BRANCH OFFICES:

New York City, 1756 Hudson Terminal Bldg.
Chicago, Ill., 812 Edison Bldg.
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San Francisco, Calif., 766 Folsom St.
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Birmingham, Ala., Brown Marx Bldg.

The AMERICAN GASOLINE LOCOMOTIVE

Evans Quarry, Marion, Ohio
"More than satisfied."—DAN EVANS

Two great Americans have made substantial records at Marion, Ohio. President Harding made good in Marion, his home town, and the American Gasoline Locomotive has made a fine record in the John Evans Lime & Stone Co., located in Marion, Ohio.

Here you will find the American conspicuous for its dogged day-in and day-out service on the routine daily, noticeably free from the small defects and troubles that frequently halt the operation of the ordinary locomotive.

The Hadfield-Penfield Steel Co.
Bucyrus, Ohio

In Buying Blast Hole Drills

DON'T buy the kind of machine that others have used and discarded!

DON'T buy a machine that the greatest Quarry Engineers of the country have condemned after severe scientific tests.

BUT—buy the Drill that takes the first place under all conditions!

☛ **BUY the "CLIPPER"! The most satisfactory Blast Hole Drill in the world!**

Visit the "Big" Quarries in the eastern half of the United States and **see what they use!**

Then write to us or come and see us and get information that will put you on the right track. Many big quarries are saving thousands of dollars annually because they took and are taking our advice about Blast Hole Drilling matters!

☛ **If you make a mistake** you have **nobody to blame but yourself.**

The Loomis Machine Company, Tiffin, Ohio

Among the Precious Stones—

GREENSTONE

Is the one lasting ornament for surfacing Stucco. The natural olive-green color blends in harmony with Nature's color scheme, and age only tends to deepen the shade. The pure white back-ground of stucco, dashed with our No. 48 product, gives you a finish of unequalled beauty and durability.

Other Greenstone Products

Building Stone (Unfinished)
Commercial Stone
Greenstone Flour
Terrazzo Stone
Roofing Granules
Poultry Grit

Prices on Application

Greenstone Products Company, Inc.
Mills: Deerfield, Md. **Roanoke, Virginia**

METRO NITE

for Stucco-

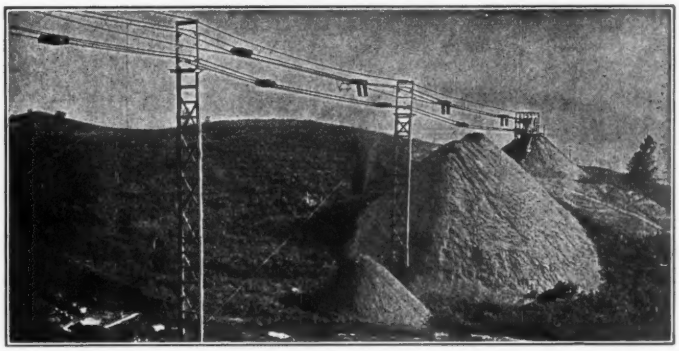
Stucco Buildings, Concrete Blocks or Bricks faced with Metro-Nite are beautiful, artistic and everlasting.

Metro-Nite White is of a crystalline character, really a siliceous dolomite. It is extremely hard, sharp and cleanly graded, making a bright, sparkling face.

Free samples mailed on request.

Two colors—White and Green.

The Metro-Nite Co.
333 Hartford Ave., Milwaukee, Wis.



This cut illustrates the method employed for discharge of loads between terminals accomplished by use of special form of bottom dump cars

CUT COSTS

You Cannot Murder Your Competitor but You Can Kill Some of Your Costs

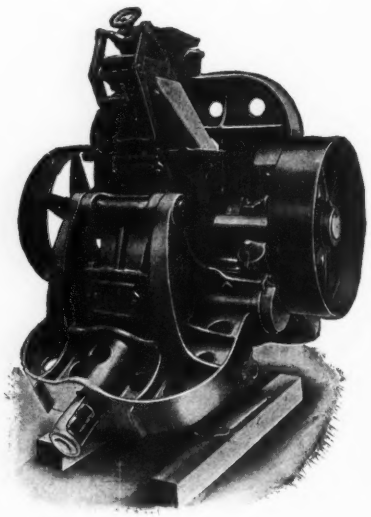
THE AUTOMATIC AERIAL TRAMWAY

Lessens the Cost of Products of the Mine or Quarry

Send for Photographs and Questionnaire

INTERSTATE EQUIPMENT CORPORATION

25 Church Street **New York City**



MAXECON MILL

Preliminary Grinder for Tube Mills

LIMESTONE .....20 to 40 Mesh
CEMENT CLINKER .....20 to 60 Mesh

MAXECON MILL
PERFECTECON SEPARATOR

The UNIT that has LARGER OUTPUT with LESS POWER WEAR and ATTENTION than any other.

It will be to the interest of those who operate CEMENT PLANTS to know what the Maxecon Unit will do.

Drop us a line **We will be glad to tell you about it**

Kent Mill Company

10 Rapelyea Street **BROOKLYN, N. Y.**

With a low price and Extravagant promises, anyone can sell once.

"Tool Steel" gears sell regularly.

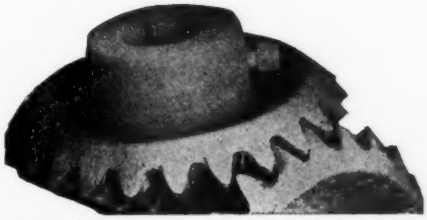
We promise that "Tool Steel" gears will last

5 to 8 times as long as untreated gears.

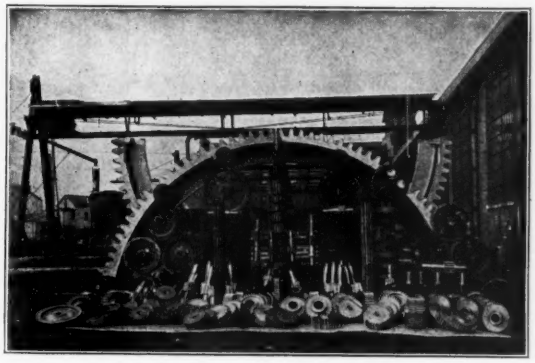
2 to 3 times as long as special quenched or case hardened gears

and

We make good on this promise.



"Tool Steel" gear about ½ worn after 58 months. Untreated gears lasted 9 months in the service

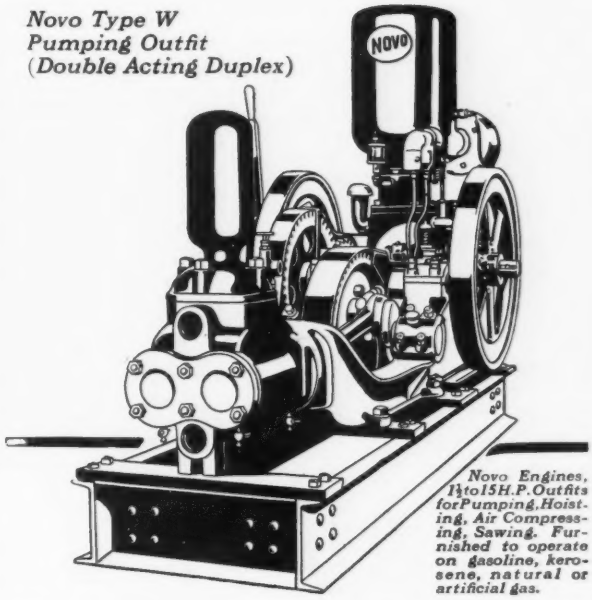


"Tool Steel" quality from the large Tube and Ball mill gears to small machinery gearing

The Tool Steel Gear & Pinion Co.

Cincinnati, Ohio

Novo Type W Pumping Outfit (Double Acting Duplex)



Novo Engines, 1½ to 15 H.P. Outfits for Pumping, Hoisting, Air Compressing, Sawing. Furnished to operate on gasoline, kerosene, natural or artificial gas.

How much idle time do you pay for because of breakdowns?

A Novo Type W Pumping Outfit can be depended on to keep running. It does not need watching—you can leave it to itself from the start in the morning till noon, and again from noon to quitting time. With a Novo Outfit on the job you don't have men standing around idle waiting for repairs to be made.

This outfit will deliver 45 gallons of water per minute through 2 miles of 2-inch pipe. It operates against pressures as high as 300 pounds per square inch—a lift of 690 feet.

Even at the highest pressures of which the pump is capable, the duplex double-acting pump sends up the water in a steady stream, because the pressure strokes overlap. The combination of Novo Engine and Novo Pump, mounted on a channel steel base, makes a unit that is portable, compact, powerful, and good for years of constant service.

NOVO ENGINE CO.

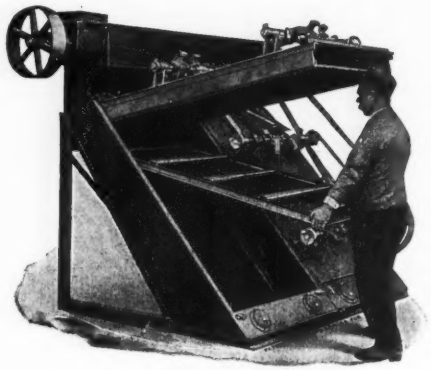
Clarence E. Bement, Vice-Pres. & Gen. Mgr.

874 Porter Street Lansing, Mich.

New York Office: 1617 Woolworth Building
Chicago Office: 800 Old Colony Building
London Concrete Machinery Co., Limited, London, Ontario
Canadian Distributors

NOVO RELIABLE POWER

STURTEVANT "ONE-MAN ONE-MINUTE" "OPEN-DOOR" MACHINERY



STYLE "M" SUPER SCREEN

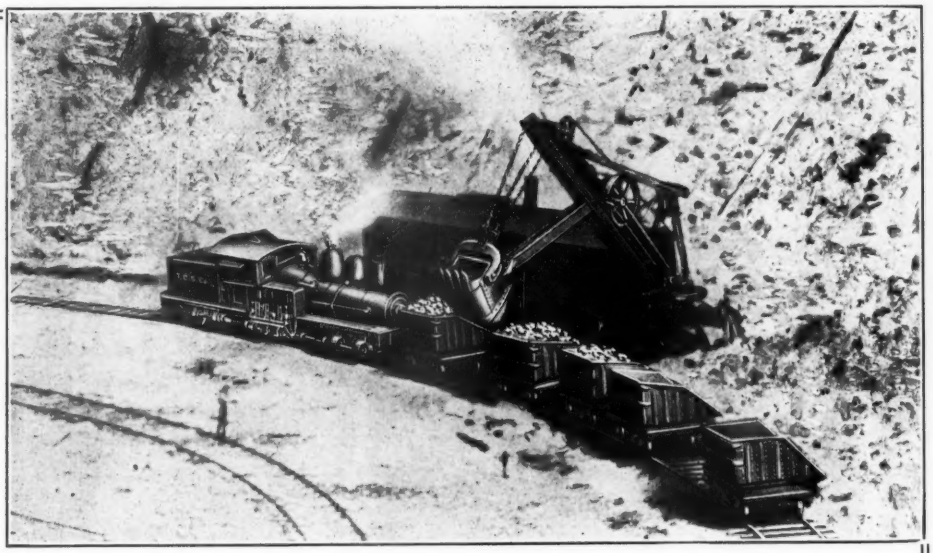
The Super-Screen not only screens everything screenable with a range of 4 to 160 mesh, giving from one to four products from one machine, but is of Sectional, or Unit, "Open Door" construction with all parts interchangeable and of such small size that one man can handle them easily and quickly. Add sufficient number of Units to secure output wanted.

You see one man opens the door, removes the screen frames, both scalper and fine screens, and tightens the cloth—all through the open door. A one man proposition throughout—no time or labor wasted. Keep the screen in perfect condition for maximum output.

STURTEVANT MILL CO., BOSTON MASS.

BOSTON: HARRISON SQ. NEW YORK: SINGER BLDG. CHICAGO: PEOPLES GAS BLDG. ATLANTA: HEALEY BLDG.

SHAYS FOR SPOTTING

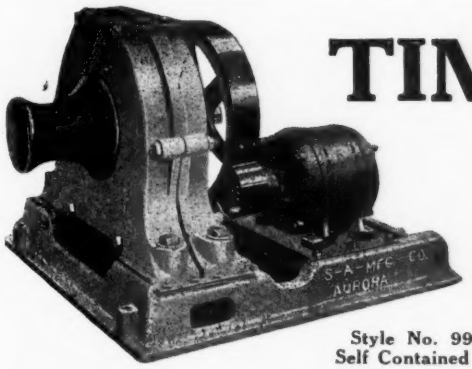


Steam shovel capacity and speed often depends upon speed of spotting cars.
In serving steam shovels, the three cylinder geared engine of the Shay makes car spotting quick and accurate.
To every revolution of the drivers, there are thirteen to eighteen power impulses.
Shay Geared locomotives spot cars 11% faster and much more accurately than rod locomotives.
Shays speed shovel operation.

LIMA LOCOMOTIVE WORKS, Inc.

LIMA, OHIO **17 East 42nd Street, New York**

TIME SAVERS—



Style No. 999-A
Self Contained Type

SAFETY CAR PULLERS

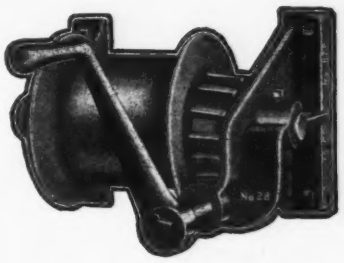
For moving loaded or empty cars on your switch track siding use an S-A Safety Car Puller.

These machines may be operated by one man and the cars can be easily "spotted" ***where*** you want them and ***when.*** No waiting for the switching crew.

SPECIFICATIONS

Size of base	4 feet by 4 feet 2 inches
Total height	3 feet ⅞ inch
Size of capstan	8 inches by 10½ inches
Speed of capstan	23 R. P. M.
Pulling speed	50 feet per minute
Capacity	4,000 pounds rope pull
Motor required	7½ H. P.

Write for Prices



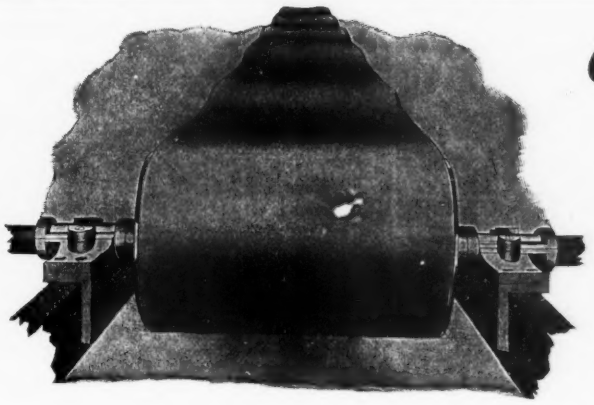
Safety Wall Winch

For hoisting loads up to 1500 lbs. the S-A Safety Wall Winch is most convenient.

Sturdy and safe, easy to operate.

No. 28 Wall Winch, 500 lb. Capacity
No. 30 Wall Winch, 750 lb. Capacity
No. 31 Wall Winch, 1000 lb. Capacity
No. 32 Wall Winch, 1500 lb. Capacity

STEPHENS-ADAMSON MFG. CO., AURORA, ILLINOIS



"ARNO" CONVEYOR BELTING

Reduces Your Cost of Handling to a Minimum

Arno Conveyor Belts are manufactured to render unusually long and satisfactory service.

Made of a combination of duck, friction and extra cover stock, they are especially constructed for carrying ores, broken stone, sand, gravel, etc.

Write for Catalog and Information

CINCINNATI RUBBER MANUFACTURING CO.

Makers of Belting—Hose—Packings and Molded Specialties
CINCINNATI, OHIO, U. S. A.

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Jaite Co., The
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Valve Bag Co. of America
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Belting

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New York Belting & Packing Co.
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Engines, Steam

Morris Mach. Works
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Owen Bucket Co.
Cleveland, Ohio.

Excavators—Dragline Cableway

Link Belt Co.
Chicago, Ill.
Sauerman Bros.
Chicago, Ill.

(Continued on page 68)

Complete Equipment Plus Engineering Service

PLANTS equipped under the Allis-Chalmers plan of "Undivided Responsibility" include the complete apparatus necessary for their successful operation.

With the apparatus designed by its own engineering staff and built in its own shops, the Allis-Chalmers organization is able to include the complete equipment in a single contract, thus saving a purchaser the burden of handling the many details, disputes, delays and oftentimes expensive complications arising where a number of separate contracts are involved.

Allis-Chalmers engineering service is of the utmost value to a user in the selection of equipment suited to his particular conditions and in its economical operation for maximum plant efficiency.

Of particular interest to Rock Products readers is the following Allis-Chalmers Equipment.

- Crushing Machinery
- Complete Crushing Plants
- Cement Machinery
- Complete Cement Plants
- Dust Collecting Systems
- Powdered Coal Plants
- Air Compressor Equipment
- Centrifugal Pumps and Pumping Units
- Electric Motor Drive and Control Equipment
- Power Units with any Type of Prime Mover
- Complete Electrical Equipment "from Prime Mover to Switchboard"
- Power Transmission Machinery

ALLIS-CHALMERS
Manufacturing Company
Milwaukee, Wis., U. S. A.
District Offices in All Leading Cities.

DORR

Make a Better Slurry, at Less Cost with the Dorr Slurry Mixer

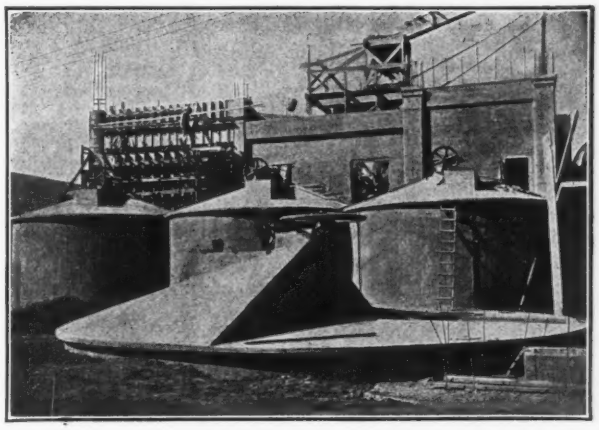
You'll get more uniform mix and a better quality, because the method of agitation and mixing prevents any stratification in the tanks.

You'll save in first cost, because the Dorr Mixer can be built in units up to 40 ft. in diameter, each with its own driving mechanism.

You'll save materially on power—one large Dorr Slurry Mixer consumes less power than one mechanism of other types having only a fraction of the capacity, and it takes two or three mechanisms of the mechanical types to operate even in very small basins.

You'll save time—about 50% on the average—in getting a uniform mix.

Let us send Bulletin 22, giving figures as to economies obtained in practice



The Dorr Company
ENGINEERS
101 Park Avenue
New York
Denver — *Research, Tests*
London — *Equipment, Design*

(Continued from page 66)

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Simsbury, Conn.

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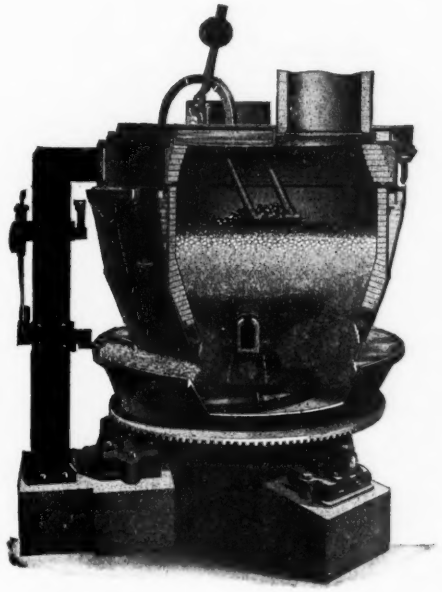

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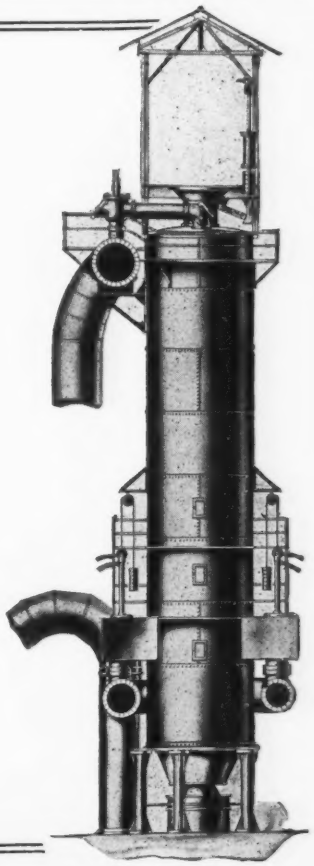

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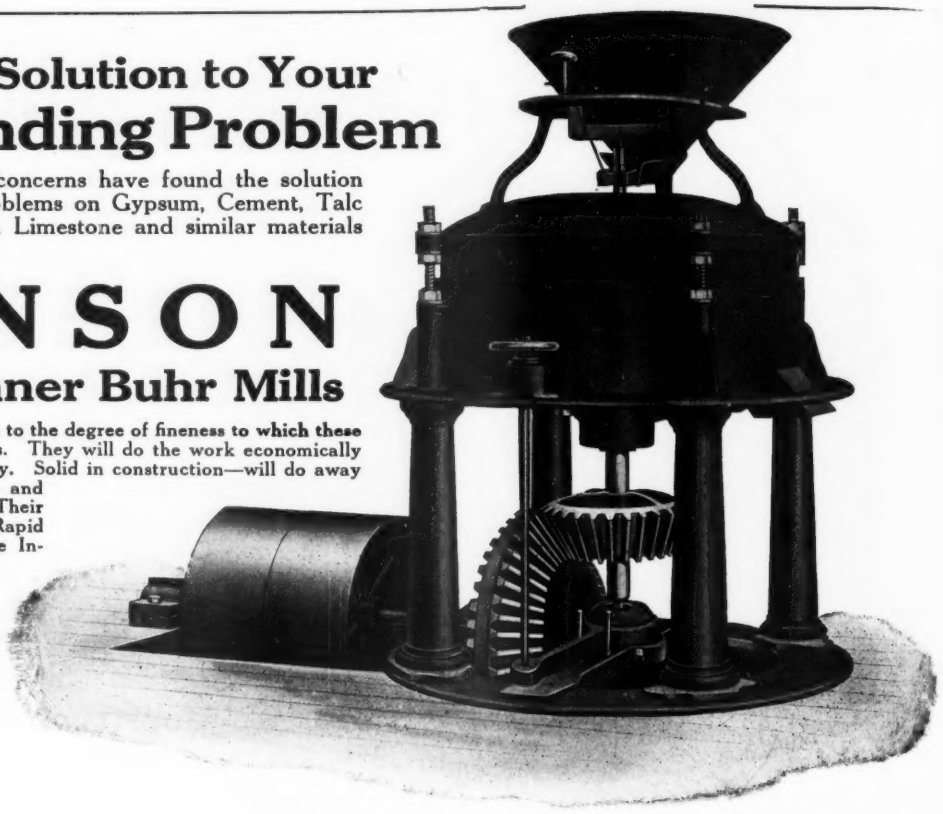

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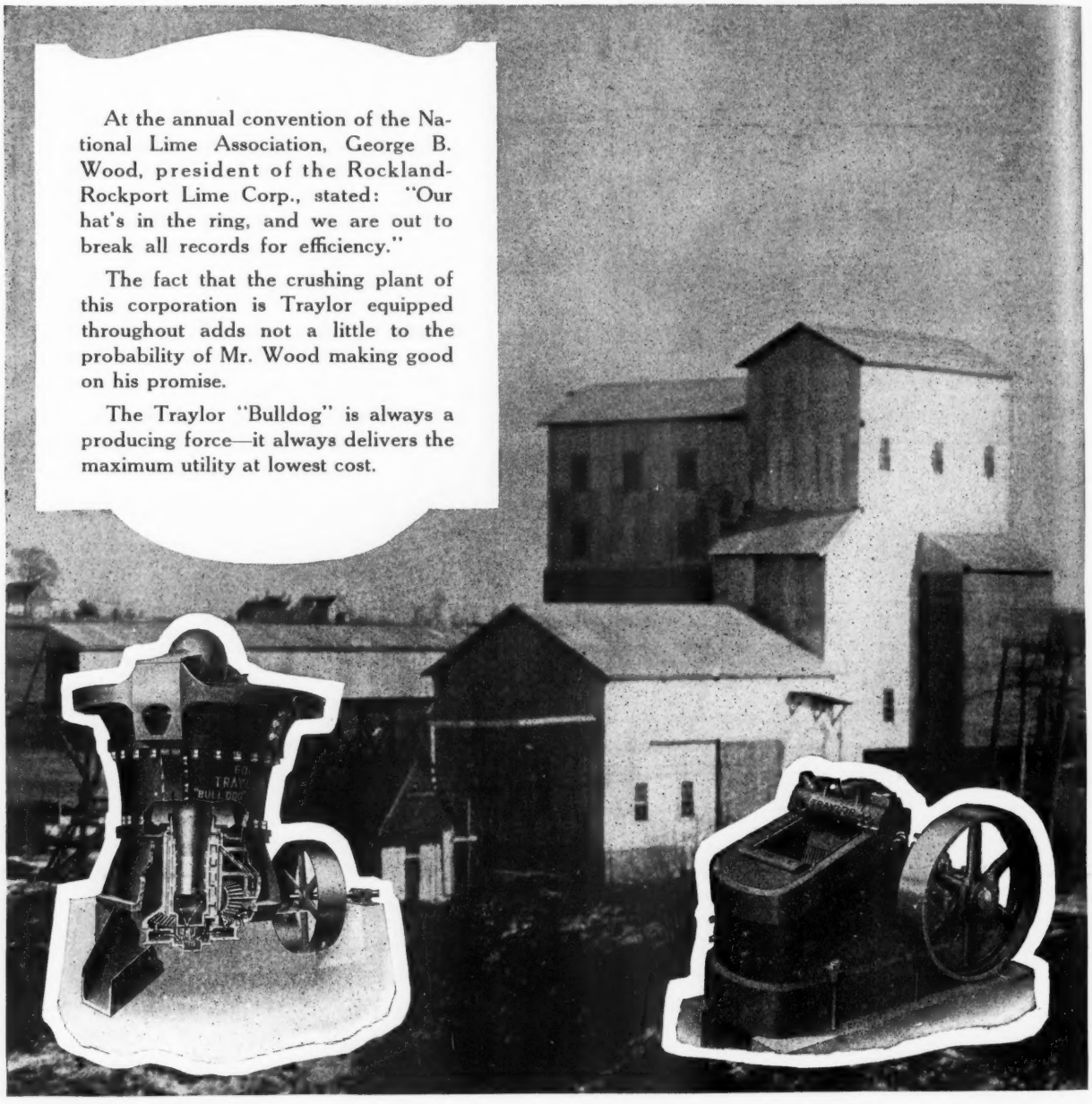

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